Maternal & Infant Characteristics Associated with Non-Syndromic Anotia/Microtia

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BACKGROUND

Anotia/microtia (**A/M**) is a birth defect characterized by an absent or underdeveloped outer ear.

A/M may cause irreparable hearing loss and often requires multiple surgeries.

Few risk factors have been identified, however, prevalence is increased among Hispanic children.

PURPOSE

Our objective was to identify factors associated with anotia/microtia.

METHODS

POPULATION

Included all non-syndromic cases in the Texas Birth Defects Registry, a population-based, active surveillance system, from 1999-2014.

CDC-BPA codes 744.01 and 744.21 used to identify cases with A/M.

Included all livebirths in Texas (~6M) during study period as a comparison group.

STATISTICAL ANALYSIS

Summarized characteristics of cases & livebirths as N and %.

Poisson regression to estimate prevalence ratio (**PR**) and 95 confidence interval (**95% CI**) of A/M.

Forward selection procedure to identify variables associated with A/M.

Performed subgroup analysis of isolated cases (no co-occurring major defects).

Table 1: Demographics of Cases & Livebirths.

	Livebirths	Any A/M	Isolated A/M
N (%)	6,181,631 (100)	1,322 (100)	982 (100)
Male sex	3,159,950 (51.1)	760 (57.5)	571 (58.1)
Singleton birth	5,994,792 (97.0)	1,270 (96.1)	959 (97.7)
Maternal race/ethnicity			
White	2,204,720 (35.7)	239 (18.1)	182 (18.5)
Black	698,954 (11.3)	40 (3.0)	23 (2.3)
Hispanic	3,004,303 (48.6)	976 (73.8)	734 (74.7)
Other	266,324 (4.3)	52 (3.9)	38 (3.9)
Maternal age (years)			
<20	759,054 (12.3)	154 (11.6)	110 (11.2)
20-29	3,350,575 (54.2)	675 (51.1)	505 (51.4)
30-39	1,931,654 (31.2)	441 (33.4)	341 (34.7)
≥40	139,824 (2.3)	36 (2.7)	21 (2.1)
Maternal education			
< High school	1,739,482 (28.1)	520 (39.3)	391 (39.8)
High school	1,742,822 (28.2)	349 (26.4)	264 (26.9)
> High school	2,656,707 (43.0)	429 (32.5)	316 (32.2)
Residence on border	771,758 (12.5)	215 (16.3)	159 (16.2)
Maternal BMI (kg/m^2)			
Normal	1,756,582 (28.4)	391 (29.6)	303 (30.9)
Overweight	1,025,864 (16.6)	227 (17.2)	177 (18.0)
Obese	1,009,993 (16.3)	242 (18.3)	162 (16.5)
Maternal diabetes	246,821 (4.0)	113 (8.5)	59 (6.0)
Prev. pregnancies not resulting in livebirths			
0	4,872,421 (78.8)	1,017 (76.9)	756 (77.0)
1	875,444 (14.2)	186 (14.1)	147 (15.0)
≥2	373,721 (6.0)	90 (6.8)	63 (6.4)
Prev. livebirth (Y/N)	3,825,481 (61.9)	831 (62.9)	628 (64.0)
Paternal race/ethnicity			
White	1,943,234 (31.4)	223 (16.9)	169 (17.2)
Black	553,597 (9.0)	37 (2.8)	23 (2.3)
Hispanic	2,543,835 (41.2)	812 (61.4)	619 (63.0)
Other	238,817 (3.4)	51 (3.9)	38 (3.9)

Table 2: PR (95% CI) of Any & Isolated A/M.

	Any A/M	Isolated A/M
Male sex	1.32 (1.18-1.47)	1.34 (1.18-1.53)
Multiple birth (vs singleton)	-	0.71 (0.44-1.13)
Maternal race/ethnicity		
White	1.00	1.00
Hispanic	2.91 (2.49-3.41)	2.89 (2.41-3.46)
Black	0.54 (0.38-0.76)	0.41 (0.27-0.64)
Other	1.75 (1.29-2.37)	1.67 (1.18-2.38)
Maternal education		
< High school	1.25 (1.08-1.45)	1.29 (1.09-1.54)
High school	1.04 (0.90-1.21)	1.09 (0.91-1.29)
> High school	1.00	1.00
Maternal age (years)		
< 20	0.86 (0.71-1.04)	0.80 (0.64-1.01)
20-29	1.00	1.00
30-39	1.18 (1.04-1.34)	1.27 (1.10-1.47)
≥ 40	1.25 (0.88-1.76)	1.09 (0.70-1.69)
Maternal diabetes	1.98 (1.62-2.41)	1.35 (1.03-1.76)
Residence on the border	0.86 (0.74-1.00)	0.83 (0.70-0.99)
Nulliparous (vs not)	1.06 (0.93-1.20)	1.03 (0.89-1.19)

Estimates are adjusted for the other listed factors. Multiple birth was not associated with any A/M and was included only in the model for isolated A/M.

Figure 1: Prevalence of A/M is Increased in Hispanic Children.

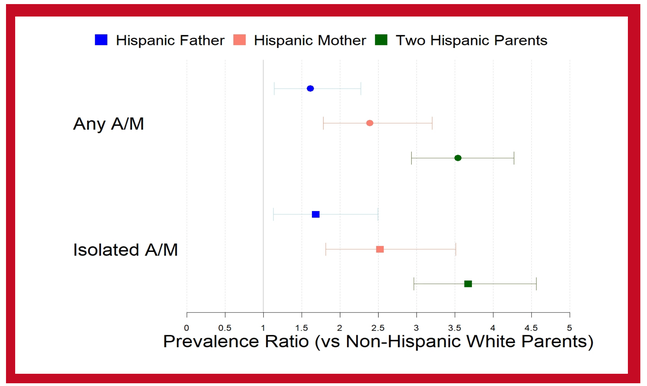
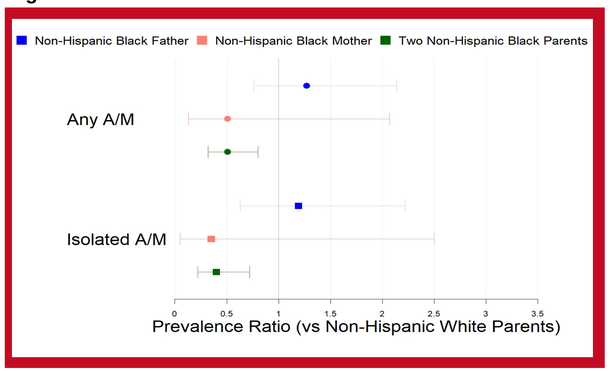


Figure 2: Prevalence of A/M is Decreased in Black Children.



RESULTS

Identified 1,322 non-syndromic cases; 982 were isolated (**Table 1**).

Male sex was associated with A/M (**Table 2**).

Regarding maternal factors:

- Diabetes, lower education, older age assoc. w/increased prevalence of A/M
- Residence on Texas-Mexico border assoc. w/decreased prevalence of A/M
- No associations w/BMI or prior fetal loss

Hispanic children at greatest risk of A/M (**Fig. 1**).

Non-Hispanic Black children at lowest risk of A/M (**Fig. 2**).

CONCLUSION

Identified several factors associated with A/M. In particular, we observed differences according to parental race/ethnicity, maternal diabetes, and residence on the Texas-Mexico border.