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Original Research

Association of Maternal Language Spoken at Home with Prenatal Care and Delivery Outcomes among Asian and Pacific Islander Populations in Kansas

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ABSTRACT

Introduction. In the United States, limited English proficiency (LEP) and provider-patient language discordance are associated with poorer medical outcomes compared with English-proficient, language-concordant patients. Asian American and Pacific Islander (AAPI) populations have higher-than-average rates of LEP and may be more vulnerable to adverse outcomes. The authors of this study examined differences in risk factors, medical care, and delivery outcomes between AAPI individuals who gave birth and spoke English at home versus those who spoke an AAPI language at home.

Methods. De-identified birth and death certificate data from January 1, 2005, to December 31, 2018, were obtained from the Kansas Department of Health and Environment (N = 17,067). Risk factors, medical care, and delivery outcomes were compared between AAPI language speakers and English speakers using likelihood chi-square and Fisher exact tests.

Results. Non-English speakers initiated prenatal care later ($p < 0.0001$) and received less adequate prenatal care ($p < 0.0001$). They also had higher rates of forceps- and vacuum-assisted deliveries ($p < 0.0001$), and third- or fourth-degree perineal lacerations ($p < 0.0001$) compared with English speakers. Neonatal outcomes largely were similar between groups.

Conclusions. Within the AAPI community in Kansas, speakers of AAPI languages experienced poorer maternal delivery outcomes, specifically higher rates of assisted deliveries and severe perineal lacerations, compared with English speakers. These disparities may reflect patient-provider language discordance, which can limit patient autonomy and influence decision-making in urgent or emergent situations, as well as broader structural determinants of health.

INTRODUCTION

In 2019, 8% of Americans aged five years or older reported speaking English less than "very well," and 22% reported speaking a language other than English at home.[1] Although many American physicians speak non-English languages, significant mismatches exist between physician language skills and the languages spoken by non-English-speaking populations.[2] This patient-provider language discordance has been associated with lower patient satisfaction, reduced access to preventive care, and fewer interventions in emergency departments compared with English-proficient (EP) patients.[3-7] Children of parents with limited English proficiency (LEP) also experience poorer health status and quality of life than those with EP parents.[8-10]

Many Asian and Pacific Islander (AAPI) languages, such as Polynesian, Burmese, Southeast Asian languages, Filipino, Korean, Indonesian, Vietnamese, Thai, and Japanese, are among the least spoken by United States physicians.[2] Consequently, speakers of these languages face greater communication barriers, further compounded by the fact that the AAPI population has a much higher LEP rate than the national average.[1]

While the use of qualified interpreters can help mitigate adverse effects of LEP, Section 1557 of the Patient Protection and Affordable Care Act (ACA) and Title VI require facilities receiving federal funds to provide meaningful access for LEP individuals.[11-13] Despite these requirements, compliance remains low, and many patients do not receive care in their preferred language, often due to time constraints, interpreter shortages, or limited accessibility.[14-18]

The authors of this study examined associations between language spoken at home and risk factors, medical care, and delivery outcomes among English speakers and AAPI language speakers within the AAPI population of Kansas.

METHODS

Data. De-identified data were obtained from Kansas birth certificates for all births between January 1, 2005, and December 31, 2018, and death certificates for infants born during that period.

Instrument. The Kansas Department of Health and Environment (KDHE) provided a de-identified dataset from the Vital Statistics Linked Birth/Death database. Demographic variables included maternal race, age, rural/urban delivery location, and payment method. Outcome variables included: month prenatal care began, adequacy of prenatal care (Kotelchuck Index), route of delivery, third- or fourth-degree perineal lacerations, significant birth injury, birth weight, and gestational age. The Kotelchuck Index categorizes care as *adequate plus*, *adequate*, *intermediate*, or *inadequate*. Significant birth injury was determined by a clinician using physical exam and delivery history.[19]

Because English proficiency was not recorded, language spoken at home was used as the primary independent variable and served as a proxy for potential English proficiency (further discussed in the limitations). "Non-English" languages included Assamese, Bahasa, Bengali, Bisayan, Burmese, Cantonese, Carolinian, Cebuano, Chin (various dialects), Chuukese, Dengka, Fijian, Filipino, Gujarati, Hakha Chin, Hindi, Hmong, Hokkien, Indonesian, Japanese, Jingpho, Kamar, Kannada, Karen, Kashmiri, Kodava, Konkani, Korean, Kosraean, Kutchi, Lao, Lautu/Lutuv Chin, Maithili, Malay, Malayalam, Mandarin, Marathi, Marshallese, Marwari, Meitei, Mongolian, Nepali, Odia, Palauan, Pohnpeian, Punjabi, Rohingya, Saurashtra, Sindhi, Sinhala, Tamil, Telugu, Thai, Tlapanec, Trukese, Urdu, Uyghur, Vietnamese, Zomi, and Zotung.

Procedures. This project was approved by The University of Kansas Medical Center Institutional Review Board (IRB). To reduce potential confounding, we included data from the vital statistics dataset on

singleton births to mothers who reported Asian or Native Hawaiian/Pacific Islander descent and spoke either English at home (hereafter referred to as "English-speakers") or one of the listed non-English languages at home (hereafter referred to as "non-English-speakers").

Statistical Analysis. Analyses were conducted using SAS Version 9.4 (SAS Institute, Cary, NC). Categorical variables were compared using Likelihood Chi-square and Fisher's exact test; continuous variables were compared using Student's t-test and ANOVA. Significance was set at $p \leq 0.05$.

RESULTS

Sample Characteristics. Demographic information is presented in Table 1. Of 536,446 singleton births, 17,067 met inclusion criteria. Most mothers were English-speaking (76.9%), aged 18-34 (79.2%), delivered in urban counties (76.0%), and had private/employer insurance (69.3%). Prenatal care typically began in the first (41.8%) or second trimester (54.6%), with most receiving adequate (51.9%) or adequate plus (29.2%) care. Spontaneous vaginal deliveries were most common (64.6%); forceps (1.9%) and vacuum-assisted (3.7%) deliveries were least common. Most had no third- or fourth-degree lacerations (98.0%). Neonatal outcomes were favorable, with 87.4% normal birth weight, 91.6% full-term, and >99.9% without significant birth injury.

Sociodemographic Differences. Compared to English-speakers, non-English-speakers were (Table 2):

- Less likely to have advanced maternal age (18.2% vs. 20.2%, p = 0.0016)
- More likely to deliver in rural counties (31.2% vs. 20.5%, p <0.0001)
- More likely to self-pay (10.1% vs. 5.5%, p <0.0001)
- Less likely to have TRICARE/Civil Health and Medical Program of the Uniformed Services (CHAMPUS; 0.7% vs. 7.2%, p <0.0001).

Prenatal Care. Non-English-speakers were less likely to initiate care in the first trimester (38.2% vs. 43.3%, p <0.0001) and more likely to receive inadequate care (16.1% vs. 11.6%, p <0.0001; Table 3).

Maternal Delivery Outcomes. Spontaneous vaginal deliveries were common in both groups, but non-English-speakers had higher rates of (Table 4):

- Forceps-assisted delivery (2.4% vs. 1.7%, p <0.0001)
- Vacuum-assisted delivery (5.5% vs. 3.2%, p <0.0001)
- Third-/fourth-degree perineal lacerations (3.2% vs. 1.6%, p <0.0001)

Neonatal Delivery Outcomes. Non-English-speakers had slightly higher rates of low birth weight (8.7% vs. 8.1%) and lower rates of macrosomia (3.5% vs. 4.7%, p = 0.0057). No significant differences were found for gestational age or significant birth injury (Table 5).

Table 1. Characteristics of people of Asian and Pacific Islander descent with singleton births in Kansas (2005-2018).

Language Spoken at Home	n (%)
Non-English	3,701 (23.1%)
English	12,334 (76.9%)
Maternal Age at Time of Birth	
10-17 years	152 (0.9%)
18-34 years	13,521 (79.2%)
35 years or more	3,390 (19.9%)
Urban vs. Rural	
Rural	4,096 (24.0%)
Urban	12,971 (76.0%)
Payment Method	
Medicaid	2,561 (15.2%)
Private/Employer	11,635 (69.3%)
Self-pay	1,224 (7.3%)
Indian Health Services	3 (<0.1%)
Civil Health and Medical Program of the Uniformed Services (CHAMPUS)/TRICARE	911 (5.4%)
Other Government	253 (1.5%)
Other	214 (1.3%)
Month Prenatal Care Began	
0-2.9 months	6,943 (41.8%)
3-6.9 months	9,077 (54.6%)
7-11.9 months	604 (3.6%)
Calculated Adequacy of Prenatal Care	
Adequate plus	4,819 (29.2%)
Adequate	8,579 (51.9%)
Intermediate	956 (5.8%)
Inadequate	2,178 (13.2%)
Delivery Method	
Spontaneous Vaginal Delivery	10,996 (64.6%)
Forceps-Assisted Vaginal Delivery	317 (1.9%)
Vacuum-Assisted Vaginal Delivery	630 (3.7%)
Cesarean Section	5,091 (29.9%)
3rd or 4th Degree Laceration	
Yes	341 (2.0%)
No	16,725 (98.0%)
Gestational Age at Delivery	
Preterm	1,433 (8.4%)
Full-term	15,589 (91.6%)
Birthweight	
Low	1,409 (8.3%)
Normal	14,909 (87.4%)
Macrosomia	749 (4.4%)
Significant Birth Injury to Neonate	
Yes	9 (0.1%)
No	17,057 (>99.9%)

Table 2. Comparison of sociodemographic risk factors of people of Asian and Pacific Islander descent with singleton births in Kansas (2005-2018): English vs. Asian and Pacific Islander (non-English) languages spoken at home.

Sociodemographic Results	Non-English-speaking	English-speaking	
	n (%)	n (%)	p-Value
Maternal Age at Time of Birth			
10-17 years	22 (0.6%)	121 (1.0%)	
18-34 years	3,005 (81.2%)	9,718 (78.8%)	0.0016
35 years or more	673 (18.2%)	2,495 (20.2%)	
Urban vs. Rural			
Rural	1,153 (31.2%)	2,533 (20.5%)	<0.0001
Urban	2,548 (68.9%)	9,801 (79.5%)	
Payment Method			
Medicaid	573 (15.6%)	1,877 (15.3%)	
Private/Employer	2,584 (70.4%)	8,525 (69.4%)	
Self-pay	370 (10.1%)	674 (5.5%)	
Indian Health Services	0 (0.0%)	3 (<0.1%)	
Civil Health and Medical Program of the Uniformed Services (CHAMPUS)/ TRICARE	24 (0.7%)	7,887 (7.2%)	<0.0001
Other Government	75 (2.0%)	164 (1.3%)	
Other	44 (1.2%)	149 (1.2%)	

Table 3. Comparison of prenatal care risk factors of people of Asian and Pacific Islander descent with singleton births in Kansas (2005-2018): English vs. Asian and Pacific Islander (non-English) languages spoken at home.

Prenatal Care Results	Non-English-speaking	English-speaking	
	n (%)	n (%)	p-Value
Month Prenatal Care Began			
0-2.9 months	1,389 (38.2%)	5,258 (43.3%)	
3-6.9 months	2,097 (57.7%)	6,509 (53.6%)	<0.0001
7-11.9 months	150 (4.1%)	379 (3.1%)	
Calculated Adequacy of Prenatal Care			
Adequate plus	1,008 (28.0%)	3,580 (29.6%)	
Adequate	1,806 (50.1%)	6,432 (53.2%)	
Intermediate	209 (5.8%)	689 (5.7%)	<0.0001
Inadequate	579 (16.1%)	1,398 (11.6%)	

Table 4. Comparison of maternal delivery outcomes of people of Asian and Pacific Islander descent with singleton births in Kansas (2005-2018): English vs. Asian and Pacific Islander (non-English) languages spoken at home.

Maternal Delivery Outcomes	Non-English-speaking	English-speaking	
	n (%)	n (%)	p-Value
Delivery Method			
Spontaneous Vaginal Delivery	2,278 (61.6%)	8,066 (65.4%)	
Forceps-Assisted Vaginal Delivery	89 (2.4%)	210 (1.7%)	
Vacuum-Assisted Vaginal Delivery	204 (5.5%)	3,394 (3.2%)	<0.0001
Cesarean Section	1,130 (30.5%)	3,664 (29.7%)	
3rd or 4th Degree Laceration			
Yes	120 (3.2%)	195 (1.6%)	<0.0001
No	3,581 (96.8%)	12,139 (98.4%)	

Table 5. Comparison of neonatal delivery outcomes of neonates born to people of Asian and Pacific Islander descent in singleton births in Kansas (2005-2018): English vs. Asian and Pacific Islander (non-English) languages spoken at home.

Neonatal Delivery Outcomes	Non-English-speaking	English-speaking	
	n (%)	n (%)	p-Value
Gestational Age at Time of Delivery			
Preterm	305 (8.3%)	1,028 (8.4%)	0.8652
Full-term	3,385 (91.7%)	11,278 (91.7%)	
Birthweight			
Low	320 (8.7%)	999 (8.1%)	
Normal	3,253 (87.9%)	10,762 (87.3%)	0.0057
Macrosomia	128 (3.5%)	573 (4.7%)	
Significant Birth Injury			
Yes	2 (0.1%)	6 (0.1%)	0.8975
No	3,699 (>99.9%)	12,328 (>99.9%)	

DISCUSSION

Sociodemographic Risk Drivers. Demographic factors strongly influence pregnancy outcomes. Extremes of maternal age, rural delivery, and self-pay or Medicaid coverage are linked to poorer prenatal care and outcomes.[20-24] These effects may stem from direct biological factors, such as oxidative stress from pollution, and indirect social or psychosocial factors, such as reduced access to amenities, increased stress, or limited healthcare access.[25]

In this study, non-English-speakers were less likely to have extremes of maternal age (a protective factor) but more likely to self-pay and deliver in rural areas, both of which increase risks of inadequate prenatal care, morbidity, and mortality.[22,24] Overall, sociodemographic risks for non-English-speakers were mixed.

Prenatal Risk Drivers. Adequate prenatal care reduces risks of premature birth, stillbirth, and infant mortality.[26] Late or infrequent visits are associated with poorer outcomes, while starting care within the first 6-10 weeks helps prevent complications.[27,28] Barriers include lack of information about services, low income, unemployment, and lack of insurance.[29-35]

Non-English-speakers in this study were less likely to begin prenatal care in the first trimester and more likely to receive inadequate care, likely influenced by higher rates of self-pay and rural deliveries.[36] Language barriers may further contribute by complicating health care

interactions, prompting discrimination, or signaling other co-occurring risks.[37]

Maternal Delivery Outcomes. Delivery carries substantial risks, with complications in ~30% of cases.[38] Vaginal delivery is generally safest,[39-45] while forceps- and vacuum-assisted deliveries, often indicated for fetal distress or prolonged labor, carry maternal and neonatal risks.[39-43] Cesarean sections can be lifesaving but are associated with higher costs, increased maternal rehospitalization, and poorer neonatal outcomes.[46-50]

Non-English-speakers had higher rates of forceps- and vacuum-assisted deliveries, possibly due to difficulties following instructions through interpreters, interpreter delays, or provider uncertainty during emergencies. Significant differences also were observed in third- and fourth-degree perineal lacerations (4-11% of deliveries),[51-55] which were more common among non-English-speakers despite their neonates' slightly lower birth weights. The higher operative delivery rate likely contributed to this finding.[55,56]

Neonatal Delivery Outcomes. Apart from minor differences in birth weight, neonatal outcomes, gestational age and birth injury rates, did not differ significantly between groups. This aligns with prior studies showing language-linked disparities in maternal outcomes but not in neonatal results.[57]

Implications. Risks linked to speaking a non-English language at home can be mitigated. Strategies include early identification of patients needing interpreters, provider training in interpreter use, and communication methods like "Teach-back." Preparing patients during prenatal visits for potential operative deliveries also could improve outcomes. Preventive measures, such as perineal massage and warm compresses, may help reduce severe lacerations.[58,59]

Limitations. Language spoken at home was used as a proxy for LEP due to dataset constraints, though prior studies suggest substantial overlap.[57,60] Race classification may have been imperfect, and hospitals' interpreter capabilities likely vary by language. Through this study, authors identified associations but not causation; future work should focus on specific languages and mechanisms behind disparities.

We acknowledge that the data predate the COVID-19 pandemic, limiting our ability to assess its specific impact. Pre- and postnatal care, interpreter access, and overall medical care may have changed since then. However, the study's focus on potentially persistent systemic barriers, its extensive 13-year dataset, and the lack of published data on this population support its continued relevance. These findings provide important insights into pre-pandemic clinical realities and establish a baseline for assessing post-pandemic health care changes in Kansas.

CONCLUSIONS

Among Asian and Pacific Islander patients, non-English-speakers were more likely to receive inadequate prenatal care and experience higher rates of operative deliveries and severe perineal lacerations. Neonatal outcomes were largely unaffected. These disparities may reflect communication barriers and structural challenges in access to care, underscoring the need for targeted interventions and further research.

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