Prenatal Care Use Among Selected Asian American Groups

Stella M. Yu, ScD, MPH, Greg R. Alexander, ScD, MPH, Renee Schwalberg, MPH, and Michael D. Kogan, PhD

Objectives. This study examined the predictors of 3 patterns of prenatal care use (no care, late initiation of care, and inadequate use after early initiation) for 4 Asian American ethnic groups in the United States.

Methods. Single live births to US resident mothers of Chinese, Japanese, Korean, and Vietnamese ancestry (n = 273 604) were selected from the 1992–1996 US natality files. Logistic regression was used to analyze the effects of maternal characteristics on the 3 use measures.

Results. Korean Americans and Vietnamese Americans had the lowest levels of prenatal care use. Young or single motherhood, high parity for age, and low educational attainment were the main risk factors for low use.

Conclusions. Considerable variability exists in prenatal care use among Asian American ethnic groups. (*Am J Public Health.* 2001;91:1865–1868)

Asian Americans are a growing immigrant population in the United States. Researchers are only beginning to understand the extent to which different Asian American groups exhibit unique patterns of maternal health risks, health care use, and health outcomes. Divergent patterns of prenatal care use and low birthweight and infant mortality risks have been observed among various Asian American subgroups, between specific Asian American groups and Whites, and between native-born and foreign-born Asian Americans.[1–13]

Early access to and adequate use of prenatal care have been associated with positive birth outcomes among Asian Americans,[1–7,14–16] and because it provides the opportunity for health education and the early identification and treatment of pregnancy complications and medical conditions, prenatal care has been promoted to reduce ethnic variations in adverse pregnancy outcomes.[1–7,14–29] Although the reasons for ethnic variations in prenatal care use are not fully understood, financial obstacles, language barriers, and cultural beliefs are frequently cited precursors to inadequate use, along with transportation problems, lack of spousal support, the need for child care, and inconvenient office hours.[16,30–37]

To date, no study has examined the use of prenatal care by Asian Americans at the national level. The objective of this study was to examine the sociodemographic predictors of 3 patterns of prenatal care use—no care, late initiation of care, and inadequate use after an early initiation of prenatal care—for the 4 largest Asian American ethnic groups in the United States: Japanese, Chinese, Koreans, and Vietnamese.

METHODS

The data used in this study were drawn from the 1992–1996 US natality (live birth) files compiled by the National Center for Health Statistics. In 1992, expanded coding of maternal race groups became available on national vital record files, which enabled the identification of Korean and Vietnamese groups in addition to those of Chinese and Japanese extraction. Single live births (n = 273 604) to US resident mothers of Chinese, Japanese, Korean, and Vietnamese ancestry were selected. Information was not available from vital records to determine whether women came to the United States before or during pregnancy. Ethnicity of the mother and father was determined by maternal report on the birth certificate. For examination of cultural effects on prenatal care use, a variable was created to indicate whether maternal and paternal ethnicity were the same.

Adequacy of prenatal care use was defined by the R-GINDEX, which incorporates 3 variables (trimester when prenatal care began, number of visits, and the gestational age of the infant at birth) to assess adequacy of use.[25,31] Gestational age in completed weeks was calculated as the interval between date of delivery and date of last menstrual period.

High educational attainment was defined as 13 or more years of education (i.e., beyond high school). Low educational attainment was defined as less than 12 years of education (i.e., less than high school). Because adolescents have not had the same opportunity to achieve the level of education as adults, adolescents 2 or more years above the grade level for their age were classified as having high educational attainment, whereas those 2 or more years below their expected grade level for their age were defined as having low educational attainment. This coding scheme facilitates the examination of the impact of low educational attainment in isolation from the influence of young maternal age.[38]

Parity was determined by the number of previous live births. Having children at home may represent a potential barrier to care owing to child care concerns. High parity for age was defined as 1 or more previous births for adolescents, 3 or more previous births for mothers aged 18 to 21 years, 4 or more previous births for mothers aged 22 to 24 years, and 5 or more previous births for mothers aged 25 years and older.[39]

Chi-square analyses were used to test for differences in the proportion of maternal risk characteristics among ethnic groups. Owing to the large number of cases in the data file, most comparisons would be anticipated to be statistically significant. Logistic regression analyses were used to examine the independent effects of sociodemographic characteristics on prenatal care use. Three separate models were run. The first model compared the receipt of no prenatal care with the receipt of any prenatal care. The second model compared early (first trimester) initiation of prenatal care with later initiation. Women with no prenatal care were excluded from the second model. The third model focused solely on women who started care in the first trimester, comparing inadequate with adequate or intermediate

TABLE 1—Maternal Socioeconomic and Prenatal Care Use Characteristics for Asian Ethnic Groups: Single Live Births to US Resident Mothers, 1992–1996

	Chinese (%)	Japanese (%)	Korean (%)	Vietnamese (%)
Single	7.48	10.65	6.17	17.86
Maternal age, y				
<18	0.31	0.87	0.50	1.37
18–34	77.73	74.52	84.91	80.45
≥35	21.96	24.60	14.59	18.19
Primipara	51.00	49.88	47.91	43.63
High parity for age	0.29	0.43	0.19	2.88
Foreign born	90.91	52.90	96.55	98.92
Educational attainment				
High	62.36	74.87	66.12	33.82
Low	13.63	2.08	3.65	31.36
Parents of same race	79.66	43.31	75.40	75.82
Prenatal care in first trimester				
No care	0.36	0.45	0.72	0.89
Started	85.48	88.70	79.95	81.48
Inadequate	3.43	2.89	4.64	4.14
N	130 634	43 781	41 902	57 287

Note. All $P < .01$.

prenatal care use. This latter model was designed to specifically target women who began care early but then did not maintain the recommended schedule of visits. The independent characteristics considered in each logistic regression analysis included nativity status, similarity of parental ethnicity, maternal ethnicity, age, educational attainment, and parity. For each of the 4 ethnic groups, the logistic regression analysis comparing first trimester initiation of prenatal care with later entry into care was repeated to assess ethnic-specific predictors of early prenatal care use.

RESULTS

Significant ethnic differences ($P<.01$) were found for every characteristic of sociodemographic and prenatal care use examined (Table 1). The percentage of mothers who were unmarried ranged from 6.2% of Korean American women to 17.9% of Vietnamese American women. Vietnamese American women were most likely to be adolescents, while Korean American women were the least likely to be 35 years or older. Vietnamese American women were most likely to be of high parity for age or to have low educational attainment. Japanese American women were the least likely to be foreign born (52.9%) or to have the same ethnicity as the father.

Japanese Americans demonstrated the highest likelihood of early initiation of care and Chinese Americans were least likely to receive no care. Vietnamese American mothers had the highest rate of no prenatal care.

The results of the logistic regression analyses are presented in Table 2. Unmarried women, teenagers, and those with high parity for age and low educational attainment were significantly more likely to have no prenatal care. High educational attainment and having the same race as the father were protective against receiving no prenatal care. Compared with Chinese Americans, the other 3 Asian American subgroups had a greater risk of not receiving any prenatal care.

Women who were unmarried, younger than 18 years, primiparous, and foreign born and who had high parity for age and low educational attainment were significantly more likely to begin care after the first trimester (Table 2). Older and more highly educated women were more likely to begin care early. Compared with Chinese Americans, Korean Americans had a greater risk of late initiation of care, while Vietnamese Americans were less likely to start prenatal care after the first trimester.

On the basis of the logistic regression analyses of less-than-adequate use for women who initiated care in the first trimester, mothers who were unmarried and foreign born and had high parity for age and the same ethnicity as the father were significantly more likely *not* to maintain an adequate use schedule after starting care early (Table 2). Maternal age of 35 years and older, primiparity, and high educational attainment were protective factors. Compared with Chinese Americans, Korean Americans were significantly more likely to have inadequate prenatal care after a first trimester start of care.

Table 3 provides the logistic regression results of the 4 ethnic-specific models of prenatal care initiation after the first trimester. For all ethnic groups, single marital status, maternal age younger than 18 years, high parity for age, and low educational attainment were risk factors for a late start of care, while high educational attainment was protective. Primiparity increased the risk of starting care late for Vietnamese Americans but decreased the risk for Korean Americans. Being foreign born increased the risk of starting care late for all ethnic groups except Vietnamese Americans; for this ethnic group, being foreign born markedly decreased the risk. Having the same race as the father increased the risk of a late initiation of care for Korean Americans but was protective for Japanese Americans and Vietnamese Americans.

DISCUSSION

This analysis revealed notable variation across ethnic groups in maternal socioeconomic characteristics and the use of prenatal care. The 2 groups that included the highest proportion of foreign-born women, Korean Americans and Vietnamese Americans, showed the greatest likelihood of receiving no care. Korean Americans exhibited a higher risk of beginning care late and receiving inadequate care even when care began early.

Many of the risk factors for no or late initiation of care found in this study were the same as those reported for the US population generally: young or single motherhood, high

TABLE 2—Odds Ratios (ORs) and 95% Confidence Intervals (CIs) From Logistic Regression Analyses of 4 Prenatal Care Use Indicators: Single Live Births to US Resident Mothers, 1992–1996

	No Care[a]		Late Care[b]		First Trimester, Inadequate[c]	
	OR	95% CI	OR	95% CI	OR	95% CI
Ethnicity						
Japanese	1.27	1.04, 1.54	0.96	0.93, 1.00	0.94	0.87, 1.02
Korean	2.23	1.91, 2.60	1.56	1.51, 1.61	1.39	1.30, 1.48
Vietnamese	1.36	1.18, 1.57	0.89	0.87, 0.92	0.94	0.88, 1.00
Single	3.08	2.67, 3.55	2.31	2.23, 2.39	1.76	1.63, 1.90
Maternal age, y						
<18	2.01	1.52, 2.65	2.74	2.47, 3.04	1.23	0.92, 1.63
≥35	0.92	0.79, 1.06	0.79	0.76, 0.81	0.77	0.73, 0.82
Primipara	0.92	0.82, 1.03	1.02	1.00, 1.04	0.82	0.78, 0.86
High parity for age	2.89	2.16, 3.88	2.09	1.89, 2.30	2.23	1.83, 2.72
Foreign born	1.10	0.90, 1.33	1.60	1.53, 1.68	1.10	1.01, 1.21
Educational attainment						
High	0.44	0.39, 0.51	0.55	0.53, 0.56	0.60	0.57, 0.64
Low	1.41	1.23, 1.62	1.29	1.25, 1.34	0.95	0.89, 1.02
Parents of same race	0.69	0.61, 0.79	1.03	1.00, 1.06	1.14	1.07, 1.21

Note. Reference group is Chinese, married, 18 to 34 years old, multiparous, not high parity for age, US born, average education, and father of different race from mother.
[a]Assesses risk of receiving no care vs any care, excluding those missing data.
[b]Assesses risk of starting care after the first trimester vs starting in the first trimester, excluding those missing data and those receiving no care.
[c]For women who start care in the first trimester, assesses risk of inadequate use vs adequate or intermediate use of care, excluding those missing data, those with no care, and those who start care in the second or third trimester.

TABLE 3—Ethnic-Group-Specific Logistic Regression Analyses of Start of Care Later Than First Trimester: Single Live Births to US Resident Mothers, 1992–1996

	Chinese		Japanese		Korean		Vietnamese	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Single	2.24	2.12, 2.36	2.84	2.60, 3.09	2.98	2.70, 3.28	1.84	1.71, 1.99
<18 y	3.37	2.70, 4.19	2.29	1.82, 2.89	2.21	1.62, 3.01	2.32	1.98, 2.71
≥35 y	0.73	0.70, 0.77	0.80	0.74, 0.87	0.92	0.85, 0.99	0.85	0.80, 0.91
Primipara	1.02	0.99, 1.06	0.93	0.88, 1.00	0.89	0.84, 0.93	1.19	1.13, 1.25
High parity for age	2.53	1.99, 3.23	2.51	1.78, 3.54	1.98	1.19, 3.29	2.01	1.79, 2.27
Foreign born	1.72	1.59, 1.85	1.82	1.70, 1.95	1.44	1.22, 1.69	0.60	0.49, 0.74
High educational attainment	0.50	0.48, 0.52	0.57	0.50, 0.58	0.58	0.55, 0.62	0.63	0.60, 0.67
Low educational attainment	1.17	1.12, 1.23	1.37	1.16, 1.62	1.97	1.75, 2.21	1.42	1.34, 1.49
Parents of same race	1.03	0.99, 1.08	0.69	0.64, 0.74	1.54	1.44, 1.64	0.96	0.85, 0.98

Note. OR = odds ratio; CI = confidence interval.

parity for age, and low educational attainment. These results corroborate findings reported elsewhere that similar maternal characteristics are associated with the poor use of prenatal care among other Asian American ethnic groups.[4] However, 2 notable exceptions emerge from the present data: the protective effect of foreign-born status for Vietnamese Americans and the elevated risk for Korean Americans when the mother and father have the same race. Future studies of the determinants of prenatal care and other health service use should focus on the role of the spouse and acculturation.

This study is limited by our inability to examine sociocultural determinants of the use of prenatal care among Asian Americans. The cultural acceptability of aspects of prenatal

care, the availability of culturally and linguistically competent prenatal services, and women's knowledge and beliefs about the importance of care during a normal pregnancy are likely to be important factors, particularly for recent immigrants. The lack of information in vital records about a woman's economic status and her length of time in the United States also limits our ability to explain the correlates of inadequate prenatal care use.

The US Department of Health and Human Services includes as one of its Healthy People 2010 objectives increasing to 90% the proportion of live-born infants whose mothers receive adequate prenatal care.[40] In addition, 1 of the 2 overarching goals of Healthy People 2010 is the elimination of health disparities across racial and ethnic groups. This emphasis underlines the importance of further investigation to determine the particular ethnic-specific determinants of prenatal care and to identify approaches to better encourage the appropriate use of prenatal care by pregnant women of all ethnic groups. ■

About the Authors

Stella M. Yu and Michael D. Kogan are with the Maternal and Child Health Bureau, Office of Data and Information Management, Rockville, Md. Greg R. Alexander is with the Department of Maternal and Child Health, School of Public Health, University of Alabama at Birmingham. Renee Schwalberg is with the Maternal and Child Health Information Resource Center, Washington, DC.

Requests for reprints should be sent to Stella M. Yu, ScD, MPH, Maternal and Child Health Bureau, Office of Data and Information Management, 5600 Fishers Lane, 18A-55, Rockville, MD 20857 (e-mail: syu@hrsa.gov).

This article was accepted January 11, 2001.

Note. The opinions expressed in this article are the authors' and do not necessarily reflect the views or policies of the institutions with which the authors are affiliated.

Contributors

S.M. Yu conceptualized the initial design and analysis of the study, contributed to the writing, and coordinated revisions. G.R. Alexander coordinated the data analysis and contributed substantially to the study's conception and design and to the drafting of the report. R. Schwalberg contributed to the literature review and the revisions. M.D. Kogan contributed to the analysis and the revisions.

References

1. Ventura SJ, Martin JA, Taffel SM, Clarke SC, Mathews TJ. Births: final data for 1997. *Month Vital Stat Rep.* April 29, 1999;47(18).

2. *Health, United States, 1999.* Hyattsville, Md: National Center for Health Statistics, Public Health Service; 1999.

3. Luke B, Williams C, Minogue J, Keith L. The changing pattern of infant mortality in the US: the role of prenatal factors and their obstetrical complications. *Int J Gynaecol Obstet.* 1993;40:199–212.

4. Kogan MD, Alexander GR, Mor JM, Kieffer EC. Ethnic-specific predictors of prenatal care utilisation in Hawaii. *Paediatr Perinat Epidemiol.* 1998;12:152–162.

5. Greenberg RS. The impact of prenatal care in different social groups. *Am J Obstet Gynecol.* 1983;145: 797–801.

6. Lieberman E, Ryan KJ, Monson RR, Schoenbaum SC. Risk factors accounting for racial differences in the rate of premature birth. *N Engl J Med.* 1987;317: 743–748.

7. Mor JM, Alexander GR, Kogan MD, Kieffer EC, Hulsey TC. Determinants of prenatal care utilization in Hawaii: implications for health promotion. *Am J Prev Med.* 1995;11:79–85.

8. Alexander GR, Korenbrot C. The role of prenatal care in preventing low birth weight. *Future Child.* 1995; 5:103–120.

9. Morrow HW, Chavez GF, Giannoni PP, Shah RM. Infant mortality and related risk factors among Asian Americans. *Am J Public Health.* 1994;84:1497–1500.

10. Alexander GR, Mor JM, Kogan MD, Leland NL, Kieffer E. Pregnancy outcomes of US-born and foreign-born Japanese Americans. *Am J Public Health.* 1996; 86:820–824.

11. Singh GK, Yu SM. Adverse pregnancy outcomes: differences between US- and foreign-born women in major US racial and ethnic groups. *Am J Public Health.* 1996;86:837–843.

12. Le LTK, Kiely JL, Schoendorf KC. Birthweight outcomes among Asian American and Pacific Islander subgroups in the United States. *Int J Epidemiol.* 1996; 25:973–999.

13. Mor JM, Alexander GR, Kogan MD, Kieffer EC, Ichiho HM. Similarities and disparities in maternal risk and birth outcomes of White and Japanese-American mothers. *Paediatr Perinat Epidemiol.* 1995;9:59–73.

14. Higgins P, Murray ML, Williams EM. Self-esteem, social support, and satisfaction differences in women with adequate and inadequate prenatal use. *Birth.* 1994;21:26–33.

15. Alexander GR, Cornely DA. Racial disparities in pregnancy outcomes: the role of prenatal care utilization and maternal risk status. *Am J Prev Med.* 1987;3: 254–261.

16. Kieffer EC, Alexander GR, Lewis ND, Mor J. Area-level predictors of use of prenatal care in diverse populations. *Public Health Rep.* 1992;107:653–657.

17. Gortmaker SL. The effects of prenatal care upon the health of the newborn. *Am J Public Health.* 1979; 69:653–660.

18. Quick JD, Greenlick MR, Roghmann KJ. Prenatal care and pregnancy outcome in an HMO and general population: a multivariate cohort analysis. *Am J Public Health.* 1981;71:381–390.

19. Showstack JA, Budetti PP, Minkler D. Factors associated with birth weight: an exploration of the roles of prenatal care and length of gestation. *Am J Public Health.* 1984;74:1003–1008.

20. Shiono PH, Klebanoff MA, Graubard BI, Berendes HW, Rhoads GG. Birth weight among women of different ethnic groups. *JAMA.* 1986;255:48–52.

21. Murray JL, Bernfield M. The differential effect of prenatal care on the incidence of low birth weight among Blacks and Whites in a prepaid health care plan. *N Engl J Med.* 1988;319:1385–1391.

22. Schramm WF. Weighing costs and benefits of adequate prenatal care for 12,023 births in Missouri's Medicaid program, 1988. *Public Health Rep.* 1992;107: 647–652.

23. Mustard CA, Roos NP. The relationship of prenatal care and pregnancy complications to birth weight in Winnipeg, Canada. *Am J Public Health.* 1994;84: 1450–1457.

24. Kogan MD, Alexander GR, Kotelchuck M, Nagey DA. Relation of the content of prenatal care to the risk of low birth weight: maternal reports of health behavior advice and initial prenatal care procedures. *JAMA.* 1994;271:1340–1345.

25. Alexander GR, Cornely DA. Prenatal care utilization: its measurement and relationship to pregnancy outcome. *Am J Prev Med.* 1987;3:243–253.

26. Petersen DJ, Alexander GR, D'Ascoli P, Oswald J. Prenatal care utilization in Minnesota: patterns of concern and areas for improvement. *Minn Med.* 1994;77: 41–45.

27. Institute of Medicine. *Preventing Low Birth Weight.* Washington, DC: National Academy Press; 1985.

28. Hogue CJR, Yip R. Preterm delivery: can we lower the Black infant's first hurdle? *JAMA.* 1989;262: 548–549.

29. Institute of Medicine. *Access to Health Care in America.* Washington, DC: National Academy Press; 1993.

30. Harvey SM, Faber KS. Obstacles to prenatal care following implementation of a community-based program to reduce financial barriers. *Fam Plann Perspect.* 1993;25:32–36.

31. Scupholme A, Robertson EG, Kamons AS. Barriers to prenatal care in a multi-ethnic, urban sample. *J Nurse Midwifery.* 1991;36:111–116.

32. Perez-Woods RC. Barriers to the use of prenatal care: critical analyses of the literature 1966–1987. *J Perinatol.* 1990;10:420–434.

33. Sable MR, Stockbauer JW, Schramm WF, Land GH. Differentiating the barriers to adequate prenatal care in Missouri, 1987–1988. *Public Health Rep.* 1990; 105:549–555.

34. Joseph CL. Identification of factors associated with delayed antenatal care. *J Natl Med Assoc.* 1989;81: 57–63.

35. Institute of Medicine. *Prenatal Care.* Washington, DC: National Academy Press; 1988.

36. Campbell JD, Mitchell P, Stanford JB, Ewigman BG. Validating a model to predict prenatal care utilization. *J Fam Pract.* 1995;41:457–464.

37. D'Ascoli P, Alexander GR, Petersen DJ, Kogan MD. Parental factors influencing patterns of prenatal care utilization. *J Perinatol.* 1997;17:283–287.

38. Petersen DJ, Alexander GR. Seasonal variation in adolescent conceptions, induced abortions, and late initiation of prenatal care. *Public Health Rep.* 1992;107: 701–706.

39. Alexander GR, Baruffi G, Mor JM, Kieffer EC, Hulsey TC. Multiethnic variations in the pregnancy outcomes of military dependents. *Am J Public Health.* 1993;83:1721–1725.

40. *Healthy People 2010.* Conference ed. Washington, DC: US Dept of Health and Human Services; January 2000.