

## USE OF COMPUTERIZED PRENATAL INTERVIEWS FOR ASSESSING HIGH-RISK BEHAVIORS AMONG AMERICAN INDIANS

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*Abstract: The objectives of this study were to determine the prevalence of risk factors for adverse pregnancy outcomes among American Indians and to compare self-reported information collected under two computer interview conditions: an "anonymous" (N=183) versus a "confidential" (N=210) format. Results indicated that under 10% in both groups reported either use of cigarettes or other drugs of abuse, 16% reported risky drinking, 39% reported psychological distress, and 8% reported physical abuse during the current pregnancy. We concluded that confidential computer interviews were appropriate vehicles for obtaining risk information in this population.*

The prenatal medical visit provides an opportunity to identify women at high psychosocial and behavioral risk for adverse pregnancy outcomes. Information regarding a pregnant woman's psychosocial problems, dietary and smoking habits, and use of alcohol and other abused substances, allows the primary prenatal caregiver to develop a holistic picture of the patient's health status and a problem-oriented approach to her prenatal care. At the same time, aggregated, population-based prevalence data are needed by health-care providers, as well, to estimate the nature and quantity of specialized services needed by the populations served. Presently, most prenatal screening is achieved either by asking the patient to complete paper-and-pencil questionnaires or by a personal interview. However, computer interviews are increasingly being recognized as an attractive alternative to these methods. Most patients like the computer interview format (Lapham, Henley, & Kleyboecker, 1993; Lapham, Kring, & Skipper, 1991), and clinicians have found the computer to be a time-saving aid in obtaining sensitive information (Paperny, Aono, Lehman, Hammar, & Risser, 1990).

The Pregnancy Information Program (PIP) is a computerized, prenatal screening program designed to assess behavioral risk factors known to contribute to adverse pregnancy outcomes, such as prematurity and low birth weight (Lapham et al., 1991). The computer interview asks about pregnant patients' perceived life stressors, including physical abuse, diet, and use of cigarettes, alcohol, and other drugs. The PIP also provides on-screen and printed individualized "feedback"—educational information regarding behaviors that promote optimal pregnancy outcomes.

The PIP has undergone pilot-testing on over 450 women receiving care in an HMO-based prenatal clinic (Lapham et al., 1991) and a Public Health Service (PHS) Hospital (Lapham et al., 1993). These pilot studies have demonstrated high patient approval ratings and a high level of concurrence between reports to the computer regarding recent smoking, alcohol, and drug use, and results of urine cotinine and drug testing. However, the pilot studies were conducted under an informed consent protocol, and patients were told that the interview results would not be given to providers. In their evaluations of the PIP, many women reported that they would be less honest if their answers were shared with their providers (Lapham et al., 1991; Lapham et al., 1993), raising the question of whether computerized assessments, such as the PIP, should be administered anonymously to increase response validity. In the present study, the PIP was administered both anonymously and as a confidential interview to comparable groups of American Indian women receiving prenatal care at a PHS hospital clinic. The objectives were to determine the prevalence rates of psychosocial problems and behavioral risks for adverse pregnancy outcomes among American Indians and to compare self-reported information collected under two computer interview conditions, an "anonymous" versus a "confidential" format.

### Method

During this study period (October 6, 1991, to March 31, 1993), staff implemented the PIP as part of routine care at a PHS prenatal clinic serving an urban population of American Indians in the Southwest U.S. Women considered eligible for the study included all patients who received prenatal laboratory blood tests within the study period and who returned for at least two subsequent prenatal clinic visits before delivery. Patients were asked to complete the PIP during their appointed hospital laboratory visits. Patients' physicians also encouraged participation. The project associate maintained a list of all women who received prenatal blood tests but did not complete the PIP. These patients' physicians were notified; however, patients were not required to complete the program.

During the first phase of the study, the PIP was administered anonymously. Patients were told to enter a first name, nickname, or false name into the computer. The name was used to personalize feedback from

the program. Patients were told that it was not possible to identify them or link their answers to their names or medical record numbers. During the next phase, women were administered a confidential version of the PIP, in which their names and medical record numbers were entered into the computer. These women were told that the information they provided would not be placed in their medical records, but a summary of their responses to the interview would be sealed in an envelope and delivered to their primary care physicians. Many of these providers had not been previously involved in the subjects' medical care. During the last month of the study, the anonymous version was again administered to equalize the number of women in the two groups.

Behavioral risk information was compared between the two groups using contingency tables. The two study groups were compared with respect to demographic characteristics, psychosocial stress variables, and reported behaviors. Psychosocial stress variables included whether the baby was wanted, evidence of psychological distress, reported level of stress, whether the patient reported someone was available for help, substance abuse by the baby's father, and history of physical abuse in the past year and during the current pregnancy (Table 1). Behaviors examined included information regarding substance use and diet. The PIP queries cigarette smoking during the pregnancy, number of cigarettes smoked, use of any alcohol during the pregnancy, number of drinks consumed per week, maximum number of drinks consumed at a time, CAGE score (for the year before the pregnancy began), and use of marijuana, cocaine, stimulants, opiates, peyote, and other hallucinogens, minor or major tranquilizers, and inhalants. The CAGE is a four-question screening instrument to detect alcoholism (Mayfield, McLeod, & Hall, 1974). Unbalanced diet was defined as two or fewer daily servings from the meat and other protein, breads and cereals, fruits and vegetables, or dairy groups. This definition was used because the Dietary Guidelines for Americans recommended at least three or more servings daily from each food group (U.S. Departments of Agriculture and Health and Human Services, 1990).

## Results

The study population consisted of 183 women who completed the anonymous version of the PIP and 210 women who completed the confidential version. Participation rates were 64% for both the anonymous and confidential portions of the study. There were no differences between the two study groups with respect to age, number of previous pregnancies, marital status, income, or level of education (Table 2). The mean age of subjects was 24.1 years, and mean number of previous pregnancies was 1.0.

There were no statistically significant differences in rates of self-reported psychosocial and behavioral risk factors for adverse pregnancy

Table 1  
 Questions From the Pregnancy Information Program (PIP) Defining  
 Psychological and Behavioral Risk Factors of Interest

Factor	Question from the PIP	Response Indicating Risk
<b>Psychosocial Stressors</b>		
Pregnancy unwanted by mother	Would you say your pregnancy was . . . (1) wanted by me and the baby's father (2) wanted by me but not by the baby's father (3) wanted by the baby's father but not by me (4) not wanted by either of us and came at a good time (5) not wanted by either of us and came at a bad time	3, 4, 5
Psychological distress	Are fears or phobias a big problem in your life? Since you became pregnant would you say you feel . . . (1) happy most of the time? (2) sometimes happy, sometimes sad? (3) unhappy most of the time? (4) very unhappy or depressed most of the time?  Would you say you feel . . . (1) relaxed most of the time? (2) sometimes relaxed, sometimes nervous? (3) nervous and anxious most of the time? (4) you have anxiety attacks?	yes OR          3 or 4 OR       3 or 4
Stress	What is your stress level now? (1) very low; (2) low; (3) medium; (4) high; (5) very high	4 or 5
No one to go to for help	Do you have someone you can go to for help?	no
<b>Behaviors</b>		
Cigarette use	Do you smoke cigarettes now?	yes
Alcohol or drug use	Do you ever drink alcoholic drinks like wine, beer, or liquor now? Do you drink (beer, wine, liquor) at least once per week/month now?	yes AND  yes OR
Alcohol or drug use	Think of the last time you drank the most beer, wine, or liquor at any one time since you knew you were pregnant. How many total drinks did you have then?	1 or more (current drinker) 3 or more (risky drinker)

Table 1 (Continued)  
 Questions From the Pregnancy Information Program (PIP) Defining  
 Psychological and Behavioral Risk Factors of Interest

Factor	Question from the PIP	Response Indicating Risk
Alcohol or drug use	When was the last time you used marijuana, cocaine or crack, stimulants, tranquilizers, hallucinogens, sedatives, opiate pain killers, inhalants (examples and street names also provided for each substance)	after I knew I was pregnant
Unbalanced diet	How many servings do you eat per day from the meat and other proteins group?	2 or fewer OR
	from the breads and cereals group?	2 or fewer OR
	from the fruits and vegetables group?	2 or fewer OR
	from the milk group?	2 or fewer

outcomes between the two groups (Table 3). Yet there was some indication that in the anonymous group several risk factors were reported more commonly: a somewhat higher percentage of these women gave two or more positive responses to the CAGE alcoholism screening test (36% vs. 28%); reported that the pregnancy was not wanted by the mother (32% vs. 26%); and reported they had been physically abused in the past year (27% vs. 19%), as compared to the confidential group.

Because the prevalence rates of the variables of interest were statistically similar between the two groups, data were combined. Overall prevalence rates and 95% confidence intervals were calculated for the entire population (Table 3). Over one-quarter of the population surveyed reported that they had not wanted this pregnancy. Married women were more likely to report they wanted the baby (83%) than single women (66%) or those with other marital status (72%) ( $\chi^2$ ,  $p < .01$ ). Wantedness also was related to the mother's age. For example, among those aged 14-19, only 59% wanted the pregnancy compared to 75% of women aged 20 or older ( $p < .05$ ). Wantedness, however, was not related to parity.

About 40% reported being bothered by fears, depression, or feeling anxious (Table 3). Almost one in ten reported inadequate psychosocial support, defined as having no one to go to for help, and 8% reported having experienced physical abuse during the current pregnancy. Smoking did not appear to be a significant public health problem in this population. Only 7% of subjects reported any cigarette use during the current pregnancy; the

Table 2  
Demographic Comparisons Between Women Administered the  
Anonymous and Confidential Versions of the PIP

Factor	Anonymous N=183		Confidential N=210	
	N	%	N	%
<u>Age*</u>				
14-19	34	23%	42	20%
20-29	90	60%	132	63%
30 +	26	17%	36	17%
<u>Parity</u>				
first pregnancy	88	48%	96	46%
second	43	24%	56	27%
third or more	52	28%	58	27%
<u>Years of Education</u>				
<12	50	27%	56	27%
12	73	40%	80	38%
>12	60	33%	74	35%
<u>Married</u>				
yes	43	23%	61	29%
never married	117	64%	133	63%
other	23	13%	16	8%
<u>Income</u>				
<\$10,000	70	38%	63	30%
\$10,000-\$19,999	36	20%	53	25%
\$20,000 +	22	12%	21	10%
refused to answer	55	30%	73	35%

\*Age is unknown for 33 women in the anonymous group. None of the differences between the groups is significant statistically.

mean number of cigarettes smoked per day among smokers was five. However, a much larger percentage reported alcohol use during the current pregnancy with 16% reporting having consumed three or more drinks on at least one occasion since pregnancy was confirmed, and almost one-third having a positive CAGE score for the year before their pregnancies. A very small percentage (3%) reported other drug use.

Table 3  
Responses to the PIP by Women Completing the Anonymous and Confidential Formats

Topic	Anonymous N=183 % (95%CI)	Confidential N=210 % (95%CI)	Total N=393 % (95% CI)
<b>Psychosocial Stressors</b>			
Pregnancy not wanted by mother	32% (25-39)	26% (20-32)	29% (25-33)
Psychological distress	38% (31-45)	40% (33-47)	39% (34-44)
Stress high or very high	17% (12-22)	16% (11-21)	17% (13-21)
No one to go to for help	9% (5-13)	9% (5-13)	9% (6-12)
Hit or physically abused in past year	27% (21-33)	19% (14-24)	23% (19-27)
during current pregnancy	9% (5-13)	8% (4-12)	8% (5-11)
Partner has alcohol problems	12% (7-17)	15% (10-20)	13% (10-16)
Partner uses illegal drugs	3% (1-5)	2% (0-4)	3% (1-5)
<b>Behaviors During Pregnancy</b>			
Cigarette use (any)	5% (2-8)	9% (5-13)	7% (4-10)
3+ alcoholic drinks on at least one occasion	17% (12-22)	14% (9-19)	16% (12-20)
CAGE score 2+ year before pregnancy	36% (29-43)	29% (23-35)	32% (27-37)
Use of drug other than alcohol	4% (1-7)	5% (2-8)	5% (3-7)
Unbalanced diet	45% (38-52)	35% (29-41)	40% (35-45)

None of the differences between the groups is significant statistically.

Forty percent of the women who completed the PIP reported an unbalanced diet i.e., intake of two or fewer servings of food each day from one of the four food groups. Unbalanced diet status was not related to age (14-19, 20-29, 30+), parity, education (<12 years, 12 years, or >12 years), income, or months pregnant (0-3, 4+).

### Discussion

Computer interviews are an attractive alternative to paper-and-pencil or personal interviews in obtaining health-risk information from pregnant women. The computer interview format obtains complete information, is well accepted by patients, and is reliable, always asking the same questions in the same way (Fawdry, 1989; Kinzie, Schorling, & Siegal, 1993; Lapham et al., 1991; Lapham et al., 1993; Paperny et al., 1990; Skinner, Allen, McIntosh, & Palmer, 1985). In addition, two previous pilot studies conducted among pregnant women have demonstrated increased reporting of high-risk behaviors on computers, compared to questionnaires (Lapham et al., 1991; Lapham et al., 1993). Another study of nonpregnant female and male teenagers demonstrated significantly more reporting of sexual behavior in the computer interview than in a written questionnaire. There was comparable reporting of risk behavior, whether or not respondents were told that the information from the computer interview would be made available to a clinician (Paperny et al., 1990).

In the present study, responses to the PIP regarding substance use by patients or their partners during pregnancy were statistically similar whether or not the computer interview was completed anonymously. However, the percentages of women reporting certain sensitive information, notably a positive CAGE and physical abuse in the past year, were higher in the anonymous group. These results suggested that there may be some trade-off using either format. To determine whether these are real differences in reporting, a study with a larger sample size should be undertaken. For example, a sample size of 431 in each group would be needed to determine that the rates of 27% vs. 19% for the "physical abuse in the past year" are statistically different between the two groups, with a power of 80% and a two-tailed alpha of .05 (Borenstein & Cohen, 1989).

A confidential computer interview format wherein responses are shared with health-care providers is appealing to providers because it enables routine, individualized screening, and an opportunity to initiate dialogue with patients about important issues. But in settings where the main interest is in defining the prevalence rates of high-risk behaviors, the use of an anonymous computer interview will maximize reporting accuracy. Clinicians contemplating the administration of programs such as the PIP must thus decide the most appropriate format in the settings under which they provide prenatal services. Another question evoked by this study is: Why is it easier for patients to report these risk factors to a machine than to write this

information on a piece of paper? Perhaps patients feel that a computer interview is more anonymous or they are motivated to be more open in order to obtain the feedback provided by the computer interview.

Few published studies of American Indian women have examined factors that were investigated in the present study. Direct comparisons are limited because of differences in population demographic profiles, study methodology, and questions asked of the subjects. The most direct comparisons can be drawn from studies of the PIP in other populations. A previous study of the PIP was conducted in 1989-1990 among 265 urban American Indian women; urine samples were analyzed to validate self-reported information (Lapham et al., 1993). This population was similar in mean age, mean parity, and years of education to that in the present study, but a lower percentage was unmarried (63% vs. 74%). The prevalence rates of cigarette smoking, alcohol use, drug use, and victimization through domestic violence reported by participants of that study were similar to those of the present study.

Another 1989 study administered the PIP to a population of 201 White and Hispanic middle-income women (C'de Baca, Lapham, Skipper, & Watkins, 1997). Compared with American Indians in the present study, this population was about half non-Hispanic White and half Hispanic women, had a higher mean age (27 vs. 24.1 years), and a higher percentage (91% vs. 73%) had at least 12 years of education. A much higher percentage of this population was married (75% vs. 36%). Compared with this non-American Indian population, American Indians were as likely to report high or very high stress levels, with 17% of patients in both studies reporting this risk factor, but were more likely to report psychological distress (38% vs. 21%, respectively) (chi-square  $p < .05$ ) (C'de Baca et al., 1997). This finding merits further study. In addition, 9% of American Indian women in this study reported inadequate psychosocial support, defined by a negative response to the question, "Do you have someone you can go to for help?" This compared to 6% of the women in the 1989 study (C'de Baca et al., 1997). Several previous studies have shown that pregnant women who reported such a lack of psychosocial support had higher rates of adverse pregnancy outcomes, compared with women who did not report this risk factor (Blake & McKay, 1992; C'de Baca et al., 1997; Williamson & LeFevre, 1992). Smoking rates (15% vs. 7%) were higher in the non-American Indian population, and rates of drinking and drug use (20%) were similar to those reported by American Indians (16% consumed 3+ drinks and 5% reported use of other drugs).

American Indians also were almost twice as likely as Hispanics and non-Hispanic Whites to report an unbalanced diet (45% vs. 23%, respectively) (Lapham et al., 1991). This finding was especially of concern, as a follow-up study found that infants born to women reporting an unbalanced diet, on average, weighed 273 gm less than infants born to women reporting a more balanced diet (C'de Baca et al., 1997). Because American Indians

suffer from a higher rate of obesity and diabetes than the total U.S. female population (Rhoades, Hammond, Welty, Handler, & Amler, 1987), this finding underscores the need for nutrition education in prenatal clinics serving American Indians.

A few additional studies have examined the prevalence rates of some of these factors in pregnant American Indians. As an extension of the 1988 National Maternal and Infant Health Survey (NMIHS), American Indian mothers who had recently given birth to live infants were sampled and mailed a questionnaire regarding their pregnancies (Sugarman, Brennenman, LaRoque, Warren, & Goldberg, 1994). The response rate for this survey was low (52%) and included 763 American Indian respondents (over half were from Arizona and California). Compared with the sample in the present study, the American Indians in the NMIHS survey were more likely to be married (40% vs. 36%), had a higher mean parity (2.9 vs. 1.0), and were less likely to have at least 12 years of education (67% vs. 73%). The mean ages were similar in the two samples (25.1 vs. 24.1 years).

Our survey revealed that 32% had a positive alcoholism screening test during the year before their pregnancies. In the NMIHS survey, 45% of American Indians reported drinking some alcohol in the 12 months before their pregnancies. Among the 35% of women who reported smoking cigarettes in the year before delivery in the NMIHS population, the average number of cigarettes smoked per day was 6.8 compared with an average of 5 cigarettes smoked per day among the 7% of pregnant women in our study population who smoked.

A study examining smoking among American Indians and Alaska Natives in Washington State found that 30% of those giving birth to live infants from 1984 through 1988 smoked during pregnancy (Davis, Helgerson, & Waller, 1992). A population-based study of urban and rural American Indians and Alaska Natives in eight counties of Washington State reported that 59% were single mothers, 20% consumed alcohol during pregnancy, and 38% smoked cigarettes during pregnancy (Grossman, Krieger, Sugarman, & Forquera, 1994). These smoking prevalence rates were much higher than those reported by the population in the present study (7%). However, it has been reported that rates of smoking were exceptionally high among Northern Plains Indians and Alaska Natives, compared with other Native populations (Morbidity and Mortality Weekly Report, 1987).

Few published studies have examined the prevalence of psychosocial stressors among pregnant American Indian women. The prevalence of physical abuse during pregnancy in this study, 8%-9%, also equaled the 8% rate obtained from a random sample drawn from public and private U.S. prenatal clinics and rates between 7% and 11% obtained in nonrandom samples from a university obstetric clinic (Newberger et al., 1992). McFarlane, Parker, Soeken, and Bullock (1992) used a three-question

screen in public prenatal clinics in Houston and Baltimore and found a much higher prevalence rate (17%), but this included physical and sexual abuse during pregnancy.

About 30% of the American Indians reported that they had not wanted the pregnancy. Comparable statistics for other American Indian/Alaska Native populations were not available. One large study conducted among 8,823 married women receiving prenatal care at Kaiser clinics defined pregnancies as unwanted if in the first trimester interview the mother reported that either she or her husband was unhappy, resentful, or upset about the pregnancy, the pregnancy was mistimed, or if either parent did not want the pregnancy (Bustan & Coker, 1994). In that study 14.4% of the pregnancies were classified as unwanted. Another small survey conducted in a family practice center in Tennessee reported that 9% of the pregnancies were "unwanted", but the specific question(s) used to determine this were not provided (Rosenfeld & Everett, 1996). In our study, unwantedness was associated with unmarried marital status and young age, underscoring a national need for improved family planning services.

In conclusion, data from this study suggested that our previous findings of increased risk reporting to the computer, compared with paper-and-pencil questionnaires, was more likely attributable to the computer interview itself, than to its anonymous administration. Prevalence rates of smoking were low, but alcohol use, suboptimal prenatal dietary intakes, and psychosocial problems appeared to be prevalent public health concerns in this American Indian population.

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