

the risk of chronic obstructive lung disease, cancer, and heart disease measured relatively high, even among smokers, and overall there has been a substantial reduction in the prevalence of cigarette smoking since its peak in 1965, it is not certain that this important objective will be achieved.

2. By 1990, at least 85 percent of the population are to be aware of the cigarette smoker's special risk of developing and worsening chronic obstructive lung disease, including bronchitis and emphysema. This goal has been surpassed. Today more than 90 percent of the population know that cigarette smoking increases one's chances of getting emphysema, and more than 85 percent know this about bronchitis.

3. By 1990, at least 90 percent of the population are to be aware that smoking is a major cause of lung cancer as well as multiple other cancers including laryngeal, esophageal, and bladder. This percentage of awareness has been achieved for lung cancer but not for other cancers. In 1985, 95 percent of men knew that cigarette smoking increases a person's chances of lung cancer. Eighty-seven percent knew this about cancer of the larynx, and 79 percent knew it about cancer of the esophagus, but only 37 percent knew it about bladder cancer.

4. By 1990, the share of the adult population aware that cigarette smoking is one of the major

risk factors for heart disease should be increased to at least 85 percent. In 1985, 89 percent of the population knew that cigarette smoking increases one's chance of heart disease.

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Perceptions of Risks of Smoking and Heavy Drinking during Pregnancy: 1985 NHIS Findings

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Synopsis.....

As part of the Health Promotion and Disease Prevention Questionnaire administered in the 1985 National Health Interview Survey, nearly 20,000 respondents ages 18-44 answered questions about their awareness of the risks of smoking and heavy drinking during pregnancy. In reference to smoking, interviewers asked about miscarriage, stillbirth, prematurity, and low birth weight; in reference to heavy drinking, they asked about miscarriage, mental retardation, low birth weight, and birth defects, as well as fetal alcohol syndrome. For each of these adverse outcomes, a majority of subjects acknowledged increased risk because of smoking or heavy drinking during pregnancy. The range was 66-80 percent of respondents for the four questions on smoking, with the perceived association to smoking strongest for

low birth weight. Approximately 84 percent of respondents associated heavy drinking with increased risk for each of the suggested pregnancy outcomes. Smoking seemed to be perceived to pose a lesser risk to pregnancy than heavy drinking. This relative lack of awareness of the pregnancy risks of smoking was more apparent among respondents with less education and more pronounced among blacks than whites. Women were more likely than men to express some opinion on these pregnancy-related questions and were more cognizant than men of the risks. On this limited

survey, Americans ages 18-44 were not very knowledgeable about fetal alcohol syndrome. Among the 55 percent who had heard of fetal alcohol syndrome, fewer than one in four correctly identified it as a set of birth defects when offered three possible definitions.

It will be interesting to correlate responses to these "knowledge" questions with NHIS data still forthcoming on reported actual smoking and drinking behavior among women respondents who were recently pregnant.

TOBACCO AND ALCOHOL ARE TWO prevalent and avoidable correlates of adverse pregnancy outcome. Maternal smoking has been associated with increased risks of a wide range of adverse outcomes, including miscarriage, fetal death, prematurity, and low birth weight (1,2). At least one prospective randomized trial of a smoking cessation program for expectant mothers has demonstrated significant increases in birth weight (3). Similarly, maternal drinking, especially heavy drinking, has been associated with conditions such as miscarriage, mental retardation of the child, low birth weight, and a characteristic set of birth defects designated fetal alcohol syndrome (4).

Previous studies have suggested that most women are aware of the possible dangers of cigarettes and alcohol, yet many continue to smoke and drink during pregnancy. Surveys of reproductive-aged women in 1980 and 1981 found that about 50 percent of them acknowledged risks of smoking during pregnancy (5) and about 90 percent acknowledged risks to the child from drinking large quantities of alcohol during pregnancy (6). Among married mothers participating in the 1980 National Natality and Fetal Mortality Surveys, 29 percent had smoked cigarettes throughout their pregnancies and 38 percent had drunk alcoholic beverages. In that same survey of pregnant women, an additional 5 percent had given up smoking, and 11 percent had given up drinking when they became pregnant (7).

The 1985 National Health Interview Survey's (NHIS) Health Promotion and Disease Prevention study surveyed a probability sample of the U.S. civilian noninstitutionalized population, including 18,499 men and women ages 18-44 who were asked questions about their knowledge of the risks of smoking and drinking in connection with the pregnancy outcomes previously mentioned. This paper is based on their responses to those ques-

tions. Further data from other questions will be available later concerning actual smoking behavior and, to a lesser extent, drinking behavior of women in that group who had recently been pregnant.

Methods

The data presented are derived from the Health Promotion and Disease Prevention Questionnaire of the 1985 NHIS. Thornberry and coworkers described the objectives and methodology of the survey in the previous issue of *Public Health Reports* (8). The questions on pregnancy risk were asked only of respondents ages 18-44, both men and women. Our results are weighted to reflect the composition of the U.S. population of that age range.

This paper concentrates on responses to three sets of questions:

1. Does cigarette smoking during pregnancy definitely increase, probably increase, probably not increase, or definitely not increase the chances of miscarriage, stillbirth, premature birth, or low birth weight of the newborn?

2. Does heavy drinking during pregnancy definitely increase, probably increase, probably not increase, or definitely not increase the chances of miscarriage, mental retardation of the newborn, low birth weight of the newborn, or birth defects?

3. a. Have you heard of fetal alcohol syndrome?

b. In your opinion, which one of the following best describes fetal alcohol syndrome: a baby is born drunk, born addicted to alcohol, or born with certain birth defects?

The respondents were classified by sex, age, race, level of education, family income, smoking

Table 1. Percent of U.S. population, ages 18-44, responding that smoking or heavy drinking increased risk for specific adverse pregnancy outcomes

Demographic characteristic	Smoking during pregnancy				Heavy drinking during pregnancy			
	Miscarriage	Stillbirth	Premature birth	Low birth weight	Miscarriage	Mental retardation	Low birth weight	Birth defects
Total	74	66	70	80	85	83	84	84
<i>Sex</i>								
Male	72	63	64	74	82	79	79	80
Female	75	68	76	85	87	87	88	88
<i>Age</i>								
18-29 years	77	69	73	82	87	86	85	87
30-44 years	71	62	68	78	82	80	82	81
<i>Race</i>								
White	75	66	71	81	85	84	84	84
Black	69	62	68	76	84	83	85	85
Other	69	57	61	69	75	73	71	71
<i>Education</i>								
Less than high school	64	56	62	70	78	77	76	77
High school graduate	72	63	69	78	85	83	83	84
Some college	77	70	72	82	87	86	85	86
College graduate	81	73	77	87	87	85	88	86
<i>Family income</i>								
Less than \$10,000	72	63	69	77	84	83	81	84
\$10,000-\$14,999	72	64	71	80	86	86	85	85
\$15,000-\$19,999	73	66	70	79	86	84	85	85
\$20,000-\$24,999	73	65	70	79	86	84	84	86
\$25,000 or more	76	68	72	82	86	84	85	84
<i>Smoking status</i>								
Never (48 percent)	79	72	75	83	...	...	...	...
Former (18 percent)	75	67	71	82	...	...	...	...
Current (33 percent)	66	57	64	74	...	...	...	...
<i>Drinking status</i>								
Abstainer (27 percent)	...	...	...	...	85	85	85	86
None recently (17 percent)	...	...	...	...	78	77	78	78
Light (27 percent)	...	...	...	...	88	86	87	87
Moderate (22 percent)	...	...	...	...	86	84	84	84
Heavy (7.7 percent)	...	...	...	...	81	80	77	79

¹See text for definitions of drinking levels.

NOTE: Weighted to correspond to U.S. population, ages 18-44, N = 99.4 million.

SOURCE: 1985 National Health Interview Survey.

status, and drinking status. The definitions for the five drinking level groups and the way individual ethanol intake was calculated were detailed in another report in this series (9). Briefly, the "heavier" drinker was one who reported ethanol consumption over the preceding 2 weeks, averaging two or more drinks per day. The "moderate" group averaged between 4 and 13 drinks per week. The "light" group reported some alcohol in the preceding 2 weeks, but three or fewer drinks per week. The "none" group were drinkers who did not have a drink during the 2-week reporting period but were not classified as abstainers. "Abstainers" included those reporting less than 12 drinks in any year or no alcohol in the past year.

Space constraints preclude comprehensive display of the data. Responses of "definitely" and "probably" have been combined in the accompanying

tables and commentary, except as noted in a few instances where the distinction appears to be meaningful.

Results

A large proportion of respondents felt that smoking and heavy drinking increased risk of each adverse pregnancy outcome suggested (table 1). All groups of respondents seemed to perceive risk during pregnancy to be greater for heavy drinking than for smoking.

For each of the four questions pertaining to alcohol, approximately 84 percent acknowledged increased risk. For the four questions regarding smoking, respondents showed greater discrimination among the various outcomes. The range was 65.8-79.7 percent. Low birth weight, the condition

Table 2. Percent of U.S. population, ages 18–44, who heard of fetal alcohol syndrome and, among those people, identified it correctly

Demographic characteristic	Heard of the syndrome	Chose correct description
Total	55	24
<i>Sex</i>		
Male	48	24
Female	61	25
<i>Age</i>		
18–29 years	51	26
30–44 years	58	23
<i>Race</i>		
White	57	24
Black	42	25
Other	32	34
<i>Education</i>		
Less than high school	34	26
High school graduate	50	22
Some college	61	24
College graduate	72	27
<i>Family income</i>		
Less than \$10,000	48	26
\$10,000–\$14,999	49	23
\$15,000–\$19,999	53	23
\$20,000–\$24,999	54	21
\$25,000 or more	60	24
<i>Drinking status¹</i>		
Abstainer (27 percent)	50	24
None recently (17 percent)	52	24
Light (27 percent)	61	26
Moderate (22 percent)	57	25
Heavy (7.7 percent)	50	22

¹See text for definitions of drinking levels.
SOURCE: 1985 National Health Interview Survey.

most clearly associated with smoking during pregnancy (1), was in fact more frequently identified than the other three and also with more conviction. Only in connecting low birth weight and smoking did more respondents say that the behavior “definitely increases risk” than said “probably increases risk.” Low birth weight was followed in order of perceived risk by miscarriage, premature birth, and stillbirth.

The limited evidence available from this survey suggested that Americans ages 18–44 were not very knowledgeable about fetal alcohol syndrome (table 2). Only 55 percent had ever heard of fetal alcohol syndrome; even among those persons who had heard, less than one-quarter correctly identified fetal alcohol syndrome as a set of birth defects when offered three possible definitions. Seventy-one percent described fetal alcohol syndrome as being born addicted to alcohol.

The demographic characteristics examined included sex, age, race, education, family income, smoking status, and drinking status. For most

questions, responses did vary significantly with each of these characteristics. Based on the populations of the groups considered and the distributions of their responses to the questions, in nearly all instances the standard error in the percentages presented was 1 percentage point or less (see table 2 in reference 8). The magnitude of the percentage differences, however, tended to be small. As an example, among female college graduates, 92 percent responded that smoking during pregnancy increases the likelihood of low birth weight, while only 3 percent responded that it does not. Among male college graduates, the corresponding numbers were 82 percent and 5 percent. Among women who were current smokers ages 18–29 (7.5 million women nationwide), 85 percent of the sample acknowledged the increased risk for low birth weight, and 8 percent denied it. Among women ages 18–29 who had never smoked, the corresponding numbers were 88 percent and 4 percent.

The trends associated with each of these demographic factors were remarkably consistent among the eight questions on perceived risk. Moreover, in addition to being uniform, the influences of these factors seemed to show little interaction. For instance, the differences in responses between men and women were largely independent of age, race, education, income, smoking status, and drinking status. Accordingly, results are not stratified in the accompanying tables.

Sex. For all eight questions, a greater proportion of women than men responded that smoking or heavy drinking increased pregnancy risk. Similarly, more women (61 percent) than men (48 percent) had heard of fetal alcohol syndrome. Among those who had heard of fetal alcohol syndrome, nearly identical proportions of women and men correctly identified it as certain birth defects. Interviewers were allowed to record a “don’t know-no opinion” response on these questions relating to pregnancy outcomes. On each question fewer women (range, 8–16 percent) than men (range, 14–24 percent) responded “no opinion.” Similarly, women were more likely than men to be “definite” rather than “probable” in their responses.

Age. For this analysis, respondents were separated into two age groups, 18–29 and 30–44. In every instance the younger group was more likely than the older group to respond that smoking or heavy drinking increased pregnancy risk. Also, the younger group uniformly had a somewhat higher

ratio of "definites" to "probables" than the older group. Conversely, the older group was more likely to say "does not increase risk" or "don't know." Those ages 30-44 were more likely to have heard of fetal alcohol syndrome but slightly less likely to identify it correctly if they had heard of it.

Race. The percentages of blacks and whites citing increased risk of heavy drinking were virtually identical for each of those four questions. The perception of the pregnancy risks of smoking, on the other hand, was consistently lower among blacks than among whites. Compared with whites, blacks were consistently more likely to answer "don't know-no opinion" but, at the same time, more likely to be "definite" than "probable" in their assessment of increased risk when expressing an opinion.

Persons of "other race," most of whom were Asian Americans or Pacific Islanders, constituted 3 percent of the U.S. population ages 18-44 and presented a very different pattern of responses. These responses should be interpreted cautiously because of the relatively small numbers in this survey (530 persons, ages 18-44) and because of the variety among people potentially included in the "other race" category. On all questions, a lower proportion in this group than blacks or whites acknowledged pregnancy risk for smoking or heavy drinking or both, largely because in all cases far more of those of "other race" responded "don't know" (range, 21-32 percent) than either blacks (12-22 percent) or whites (10-19 percent). Persons of "other race" were less likely to have heard of fetal alcohol syndrome (32 percent) than either blacks (42 percent) or whites (57 percent), but were more likely to identify it correctly if they had heard of it.

Education. Awareness of the risks of smoking and heavy drinking increased consistently and markedly with increasing education, with a more apparent effect on the questions about smoking. For the four questions on smoking, between 10 and 16 percent of persons with less than a high school education asserted that smoking during pregnancy did not increase risk, compared with 4-12 percent among college graduates. On all questions, the greater the education, the less likely the respondent was to express "no opinion." On the other hand, persons with more education were more likely to answer "probably" rather than "definitely" compared with those with less education. Persons with

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more education were much more likely to have heard of fetal alcohol syndrome and somewhat more likely to identify it correctly.

Family income. For these questions on pregnancy risk and fetal alcohol syndrome, the trends associated with variations in family income were the same as the trends associated with variations in education, but the magnitude of the associations was much less strong for income than for education.

Smoking status. In each of the four questions on pregnancy risks of smoking, the perception of risk was highest among never smokers, followed by former smokers and, more distantly, current smokers. Conversely, in each case current smokers were most likely to say smoking "does not increase" risk (average, 16 percent) or "don't know" (average, 19 percent), followed by former smokers and never smokers (9 percent, "does not increase"; 14 percent, "don't know").

That never smokers were more aware of pregnancy-related smoking risks than were former smokers contrasts with the results of questions on emphysema, chronic bronchitis, lung cancer, laryngeal cancer, and heart disease. For those conditions, former smokers ages 18-44 consistently were more cognizant of the risks of smoking than never smokers (10). One can suggest as possible explanations that (a) the risks of these respiratory and cardiovascular conditions have been better documented and more widely publicized for a longer time than the smoking-associated risks to pregnancy, and (b) former smokers, women as well as men, were more likely to have stopped smoking to avoid lung and heart disease than to avoid adverse reproductive outcomes. The observation that the

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gap in awareness of pregnancy risks of smoking between former and never smokers was slightly less for women than for men could corroborate this interpretation. Moreover, for low birth weight only, the proportion of female former smokers aware of increased risk was equally high as that of female never smokers (88 percent).

Drinking status. In the four questions on pregnancy risks of heavy drinking, the pattern of the responses of light, moderate, and heavier drinkers paralleled the pattern for never, former, and current smokers on the smoking-related questions. Heavier drinkers acknowledged increased risk less frequently and answered "does not increase risk" and "don't know" more frequently than moderate or light drinkers.

Abstainers were no more likely than light or moderate drinkers to think that heavy drinking increased risks of adverse pregnancy outcomes, but they were less likely to assert that heavy drinking did not increase risk and more likely to have "no opinion." Responses of the "none" group (drinkers who reported no alcohol consumption in the preceding 2 weeks) are difficult to compare with the rest. This "none" group, particularly the men, consistently said "no opinion"—or they refused to answer—more frequently (average, 19 percent) than any of the other four drinking status groups (average, 10 percent).

Fewer heavier drinkers than moderate or light drinkers reported having heard of fetal alcohol syndrome, and heavier drinkers who had heard of it were less likely to identify it correctly.

Discussion

Responses to these questions clearly suggest that more Americans perceived heavy drinking rather

than smoking to be a risky practice for expectant mothers. More respondents cited increased risk caused by heavy drinking than by smoking, and their feelings were more often "definite."

What factors might underlie or mediate these perceptions? One factor might simply be the term "heavy drinking," which was not defined for the survey participants. To what extent were the harsher judgments of the risks of heavy drinking compared with smoking a reflection of this undefined adjective? Another aspect could be the relative prevalence of smoking compared with heavy drinking in our society, and the associated difference in public image between the two practices. Thirty-three percent of Americans ages 18–44 in this survey were current smokers; by the definition used here, 7.7 percent were heavy drinkers, only 2.6 percent among women. It may be easier to castigate a behavior that is less prevalent in one's community, and this factor might affect the relative strength of judgments about heavy drinking and smoking.

It is easy to have qualms about interpreting a survey such as this, which endeavors to measure knowledge by asking people for what may well be their opinions. Did these questions measure knowledge of the risks of smoking and heavy drinking; gauge attitudes toward these habits; or merely assess something about the willingness of different groups to make guesses, confess ignorance, or passively acquiesce to answers implied in the questions? It is sobering to note that on the one question that required respondents to choose an objective answer among three choices, only 24 percent chose the correct description of fetal alcohol syndrome—several standard deviations fewer than the 33 percent who would have been expected to choose it randomly.

There were interesting differences in the frequencies of "no opinion" responses and the proportions of "definites" to "probables" among respondents who were male or female, young or old, white or black or other, and rich or poor. Such differences pose potential questions for designers of surveys like the NHIS. Did these differences in responses accurately reflect levels of knowledge, or were the results skewed by differing norms and predilections of different cultural groups? Did the high proportion of "no opinion" responses among Asian Americans, for example, signify actual lack of information or just a reluctance to venture guesses? Does it mean that more intensive public awareness efforts ought to be directed at them, or does it merely mean that

interpretations of their responses ought to allow for possible idiosyncrasies of culture?

Conclusion

Analysis of responses to these few questions from the Health Promotion and Disease Prevention Questionnaire of the 1985 NHIS leads to several observations about the perceptions of Americans of reproductive age concerning the risks of smoking and heavy drinking during pregnancy. Substantial majorities of survey respondents, especially young women, attributed hazards to both smoking and heavy drinking during pregnancy. In concordance with the relatively clear evidence associating smoking and low birth weight, more people (80 percent) linked smoking to low birth weight than to miscarriage (74 percent), prematurity (70 percent), or stillbirth (66 percent). Even higher proportions (nearly 85 percent) felt that heavy drinking increased risks for miscarriage, mental retardation, low birth weight, and birth defects. However, among the 55 percent of respondents who reported having heard of fetal alcohol syndrome, nearly three-quarters had misconceptions about it.

The high proportions of respondents who acknowledged the dangers of tobacco and alcohol for expectant mothers are, in one sense, a measure of success for the considerable efforts by the public health community to publicize those dangers. However, persons of low income and members of racial minorities (those at high risk for adverse pregnancy outcomes) appear to be relatively less aware of the consequences. Future work should be directed toward these high-risk groups.

The responses to these knowledge questions reveal something about the attitudes of Americans toward the use of tobacco and alcohol during pregnancy. Additional data from the 1985 NHIS, yet to be tabulated, will allow analysis of the actual amount of smoking and drinking reported by women before, during, and after their pregnancies. Correlating behavior with "knowledge" should reveal a great deal more.

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