

POPULATIONS AT RISK ACROSS THE LIFESPAN: EMPIRICAL STUDIES

Health Risk Behavior of Rural Low-Income Expectant Fathers

Kevin D. Everett, Linda Bullock, Jeffrey D. Gage, Daniel R. Longo, Elizabeth Geden, and Richard Madsen

ABSTRACT Objectives: To assess expectant fathers' health risk behaviors and attitudes about pregnancy-related health issues. Pregnancy may be viewed as a *teachable moment*: a time when women are receptive to health advice and take action to improve their health and the health of their babies. Pregnancy may also be a teachable moment for expectant fathers, although men's behaviors are rarely considered as part of prenatal care or in associated research. **Design:** Cross-sectional prevalence study. **Sample:** Rural low-income expectant fathers ($N = 138$) whose pregnant partners had enrolled in a Medicaid managed care health plan. **Measurement:** A telephone survey measuring five health risk behaviors, sociodemographic variables, and pregnancy- and behavior change-related attitudes. **Results:** Analyses found the following: 49.3% smoked cigarettes; 30.4% engaged in hazardous drinking in the past month; 27.5% had very low physical activity levels; 94.9% had at-risk fruit/vegetable intake; and 42% had weight-related health risk (25.4% met body mass index [BMI] criteria for obesity). Further, 47.9% of the men engaged in three or more of five assessed health risk behaviors. **Conclusions:** This sample of expectant fathers engages in high rates of health risk behaviors. Failure to address the health risk behavior of men during prenatal care represents a missed opportunity to improve paternal, maternal, and family health.

Key words: family health, fathers, prenatal care, risk factors.

Pregnancy can be viewed as a “cue event” that can increase motivation for health behavior changes. In

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health care settings, these cue events, often colloquially labeled as “teachable moments,” are seen as a time when many young women become receptive to health advice and are more likely to take action to improve their own health in order to positively impact the health of their babies. It is possible that pregnancy may also be a teachable moment for expectant fathers. However, men's health risk behavior is rarely considered as a part of prenatal care or in associated research. Related areas of research support the need to address young men's health behavior. Epidemiological survey research consistently finds that young adult men engage in the highest rates of health risk behaviors compared with other age groups (Centers for Disease Control and Prevention [CDC], 2004; National Survey on Drug Use and Health, 2003). There is a paucity of information about young men's health behavior during pregnancy; more information will help determine whether there is a need and/or an opportunity for intervention.

Factors unique to pregnancy and becoming a parent can alter beliefs about health and may motivate an individual to change health risk behaviors. Clinicians can capitalize on a person's activated motivation and

facilitate successful behavior change. Enhanced motivation through a cued event is viewed in most accepted health behavior models as a key element in the cascade of events that can lead to behavior change (Ajzen & Fishbein, 1980; Bandura, 1977; Prochaska & Velicer, 1997). In a synthesizing review that draws from these health behavior models, three underlying cognitive elements determine whether a cueing event is momentous enough to be a "teachable moment" through (1) prompting strong affective or emotional responses, (2) increasing perception of personal risk and outcome expectancies, and (3) redefining self-concept and/or social role (McBride, Emmons, & Lipkus, 2003). The cueing event, as a cognitive precursor to behavior change, allows for interpretations and judgments of an event to prompt subsequent behavior change. The heuristic assumes that life and health events are comprised of objective experiences to which individuals have a subjective response.

During pregnancy, all three elements are likely affected (McBride et al., 2003). For example, a change in perception about the health risks or outcomes of continued smoking could occur (e.g., "smoking could harm the baby"). Emotional responses for a person expecting a baby could include elation, fear, or worry. How one gives meaning to these responses and copes with these emotions could impact health behaviors. Becoming a parent requires psychosocial adjustment to new roles and responsibilities. A body of research has described developmental stages, experienced as cognitive and behavioral changes, of expectant fathers during their partners' pregnancies (Pruett, 1998; Storey, Walsh, Quinton, & Wynne-Edwards, 2000; Tiedje & Darling-Fisher, 1996). The degree to which a parent accepts role changes and new responsibilities can be reflected in health behavior choices. Implicit in the described heuristic is the notion that the "teachable moment" occurs proximal to health care providers who can access and intervene with the population experiencing the life change event.

Health-related behaviors and decisions of women during pregnancy can be influenced by the attitudes and behaviors of male partners. For example, the support of a male partner can contribute to an increase in the initiation and duration of breastfeeding (Littman, Medendorp, & Goldfarb, 1994).

Further, smoking behaviors of male partners are a significant factor related to the success of women's smoking cessation during pregnancy (McBride et al., 1998), and partner smoking is a strong predictor

of maternal quitting and relapse (Severson, Andrews, Lichtenstein, Wall, & Akers, 1997). If a male partner continues to smoke during pregnancy, this behavior is a critical factor in whether a woman continues to smoke or returns to smoking postpartum (Fingerhut, Kleinman, & Kendrick, 1990; Hakansson, Lendahls, & Petersson, 1999; Lu, Tong, & Oldenburg, 2001).

Additionally, a woman who drinks alcohol finds it harder to stop drinking or cut down during pregnancy if her partner continues to drink during pregnancy (May, 1995). In this regard, health risk behaviors of expectant fathers could be examined not only because of their effects on his health but also in the context of their effects on his partner or outcomes of the pregnancy.

Expectant fathers' health behaviors have rarely been considered as part of prenatal care or in associated research. A developing body of evidence suggests that in addition to influencing the health behavior change of their partners, some expectant fathers also focus on changing their own health behaviors during pregnancy. The transition to fatherhood can be a time when many men develop a heightened sense of responsibility toward themselves and their families (Holland, 1994). A qualitative study found that some first-time fathers actively seek health information, take action to improve their health, and make joint health decisions with their partners during pregnancy (Gage & Kirk, 2002). Conversely, the stress associated with pregnancy may lead some expectant fathers to continue or even initiate problematic health behaviors. For example, in a telephone health risk behavior survey, expectant fathers were asked questions relating to smoking, exercise, alcohol abuse, depression, and use of firearms. Specific health problems were reported with regard to smoking and hazardous drinking (Meyer, Meyer, Howes, Ruhlen, & Pickett, 1997).

The purpose of our pilot study was to increase knowledge about men's behavior during pregnancy. We describe health risk behaviors, attitudes, and beliefs of rural low-income men. Gathering this basic information represents a first step in understanding men's health risk behaviors and attitudes about pregnancy. The findings can provide useful information that may lead to developing health interventions and guide future research to promote paternal, maternal, and child health during the perinatal period and beyond.

Methods

Design and sample

In this cross-sectional prevalence study, potential project participants were referred from a Medicaid managed care organization in Mid-Missouri and data were collected for 14 months beginning August 2002. This health plan provides services to 18 primarily rural counties (only one city with a population greater than 50,000 in the region). Initial prenatal screening by the health plan organization identified pregnant women who were at least 18 years old, lived with their male partners, and gave consent for the research team to contact their male partners by telephone. Next, these men were called and offered an opportunity to participate. Inclusion criteria included that men be living with their pregnant partners, aged 18 years or older, English-speaking, and with telephone access. Following verbal consent, expectant fathers answered survey questions read over the telephone by trained research assistants. Telephone surveys administered by trained research assistants were completed by 138 men (78% participation rate for contacted eligible men). Standardized prompts and decisions for coding responses were provided. Answers to questions were entered on a data sheet by the research assistants. The recruitment, consent, and telephone survey procedures were approved by the university Institutional Review Board. Men were paid \$10 for their time and effort as participants.

Measures

The investigative team developed a survey measuring lifestyle behaviors, demographic characteristics (race/ethnicity, education, employment), and pregnancy-related variables. Additionally, statements designed to measure men's attitudes about health behaviors, pregnancy, and fathering roles were included as part of the survey. Three question formats were used: questions requiring a quantitative numeric answer, questions with a multiple-choice format, or rating statements using a Likert-like scale. The Behavioral Risk Factor Surveillance System Questionnaire (BRFSS) (Centers for Disease Control and Prevention [CDC], 2001) was used as a guide to develop questions about tobacco use, nutrition, exercise, problematic alcohol use, and general health status.

Analytic strategies

Univariate descriptive statistics (frequencies, means, standard deviations) were calculated to comprehen-

sively describe demographic characteristics, lifestyle behaviors (tobacco use, alcohol use, body mass index [BMI], exercise, and nutrition), and attitudes about pregnancy, behavior change, and fathering roles. Next, using CDC definitions (CDC, 2001), lifestyle behaviors were categorized into health risk behaviors. The prevalence of each of the individual risk behaviors (including 95% confidence intervals) was calculated. The definition of a smoker was currently cigarette smoking either daily or on some days of the week. Hazardous drinking was defined as consuming five or more drinks on a drinking day in the past month. At-risk nutrition was defined as eating less than five fruit or vegetable servings per day. A BMI of 27.8 or greater was used to define men at risk for weight-related health problems. Subjects with no exercise outside of work were categorized with the health risk of low physical activity. To understand risk behaviors more completely, an analysis using frequency counts identified all possible clustering patterns or various combinations to examine individuals with multiple health risk behaviors. Finally, bivariate analyses using chi-square tests examined the number of health risks in comparison with demographic and attitudinal ratings. Wilcoxon's rank sum tests were used to compare the ordinal response of number of risk factors against categorical demographic variables (e.g., rural-urban residence). If there were more than two levels in a category, Kruskal-Wallis tests were used. The Spearman rank correlation coefficient was used to assess the correlation between two ordinal variables. Database management and statistical analyses were performed with SAS software, version 9.1 (SAS Institute Inc., Cary, NC).

Results

Demographic characteristics

Telephone surveys were completed by 138 men who on average were 26.7 years old and interviewed at 21 weeks' gestation of the pregnancy. Most of the men were married (61.6%), lived in a rural area (87.0%), and were employed (86.2%). The men had lived with their partners for 3.3 years on average. Table 1 provides additional demographic descriptions of the sample.

Descriptions of lifestyle behaviors

Smoking. In this sample, 83 men (63%) indicated smoking at least 100 cigarettes in their lifetime, an additional 15% had at least tried smoking but had

TABLE 1. Selected Demographic Variables of Expectant Fathers Sample

Variable	Expectant father			
	Mean	SD	n	%
Age in years	26.7	6.7		
21 years or younger			29	21.0
22–29 years old			75	54.3
30–35 years old			21	15.2
36 years or older			13	9.4
Time living together in years	3.3	3.2		
Less than 1			32	23.2
1–5			79	57.2
Greater than 5			27	19.6
Other			8	5.7
Number of persons in household	3.1	1.3		
2 (i.e., couple only)			57	41.3
3–4			63	45.7
> 5			18	13.0
Marital status				
Married			85	61.6
Living together			53	38.4
Time of interview (weeks pregnant)	21.0	7.9		
Education				
< High school graduate			32	23.2
High school graduate or equivalent			59	42.7
> High school graduate			41	29.7
College graduate			6	4.4
Race/ethnicity				
White			120	87.0
Black			10	7.3
Other			8	5.7
Employed for wages				
Yes			119	86.2
No			19	13.8
Residence				
Rural			120	87.0
Nonrural (city 50,000–100,000)			18	13.0
Any visit to health care provider in the past year				
Yes			97	71.8
No			39	28.2
Diagnosed medical problems				
Yes			24	17.4
No			114	82.6
Rating of general health status				
“Excellent”			32	23.2
“Good” or “very good”			95	68.8
“Fair” or “poor”			11	8.0
Partner smoking at time of interview				
Yes			32	23.2
No			106	76.8
Partner smoking within the past year				
Yes			62	44.9
No			76	55.1

not smoked 100 cigarettes, and 22% had never tried smoking. At the time of the telephone survey, 49.3% of men were current smokers (39.1% indicated smoking daily and 10.2% smoking on some days). In the past year, 70.1% of current smokers indicated stopping smoking for 1 day or longer because they were trying to quit.

Alcohol use. Current alcohol use was reported by 52.2% of the men in this sample while 8.7% never drank, and 39.1% drank in the past but no longer drink. During the past month, 30.0% of the sample indicated having five or more drinks on one occasion. For current drinkers, 31.9% drink five or more drinks on days they drink alcohol. Of those men who no longer drink, 42.6% of 54 men stopped drinking because it was causing legal, relationship, or health problems.

BMI. This index was computed using a formula based on the self-reported weight and height of each participant (kg/m²). The average BMI for our sample was 27.1 (range 19.1–42.4). No men were categorized as “underweight” (BMI below 18.8); 33.3% were “normal” (BMI 18.5–24.8); 41.3% were “overweight” (BMI 25–29.9); and 25.4% were “obese” (BMI 30 or greater).

Nutrition. Men were questioned about the number of servings of fruit and vegetables they consumed on an average day and how many times they ate meals from fast food restaurants each week. In this sample, 4.4% of men indicated eating no fruit or vegetables, 71.0% ate one or two servings, 19.6% ate three or four servings, 2.9% ate five or six servings, and 2.2% ate six or more servings on an average day. Men reported the number of times they ate fast food each week, with 76.1% indicating three times or less, 15.9% eating four to six times, and 8% eating seven or more times per week.

Physical activity. In this sample, 72.5% of men indicated participating in physical activities or exercise (other than regular job activities) in the most recent month. Work-related activity level reports indicated that 30% of the men are mostly sitting or standing, 26% mostly walking, and 44% engaged in mostly heavy labor or physically demanding work.

Ratings of pregnancy, behavior change, and fathering roles statements

Participants answered statements pertaining to health, parenting, pregnancy, and behavior change.

Using a Likert-type scale, men indicated whether they “strongly agreed,” “agreed,” “disagreed,” or “strongly disagreed” with the statements. Greater than 97% of the sample agreed (“strongly agree” or “agree”) with the following statements: “I feel ready to accept the responsibilities of being a father,” “Men have an important role during their partner’s pregnancy,” “Having a baby is exciting,” “It is important for my partner to have a healthy diet,” and “I am willing to change some of my health behaviors to help my partner change some of her health behaviors.” Over 98% of the sample disagreed (“strongly disagree” or “disagree”) with the statement “Smoking near children or babies is okay.” Questions with a more equal split of agreement versus disagreement included: “Children learn to be healthy more from their mothers than from their fathers” (43.5% strongly agree/agree; 56.5% disagree/strongly disagree) and “I am worried about being a good father” (50.7% strongly agree/agree; 49.3% disagree/strongly disagree). The results for all statements are presented in Table 2.

Health risk behaviors

Using CDC definitions, the lifestyle behaviors described above were categorized into health risk behaviors based on smoking, hazardous drinking, BMI, nutrition, and physical activity. Table 3 shows the fre-

quencies (and 95% confidence intervals) of these behaviors. On average, an expectant father in this study engaged in 2.44 of the five health risk behaviors assessed, with 1.5% of the men having all five of the examined risk behaviors, 8.7% with four risk behaviors, 37.7% with three risk behaviors, 38.4% with two risk behaviors, 12.3% with one risk behavior, and 1.5% with no risk factors. At-risk nutrition is a risk factor for 94.9% of this sample, and therefore is a variable with low discriminatory capability. To further characterize the sample in relation to risk factors, an analysis determined all of the possible clustering patterns or combinations of risk factors of the expectant fathers. Our sample generated 22 of 32 possible profiles. The 10 most common clustering patterns are presented in Fig. 1 and represent 88% of the sample.

Health risk behaviors in relation to other variables

Bivariate analyses using chi-square tests compared men and their number of health risk behaviors with demographic and beliefs/attitudes variables. Men with more risk factors had lower formal education levels (Kruskal–Wallis = 5.6, *df* = 2, *p* = .017), a partner who was a smoker within the past year (Wilcoxon’s rank sum = 9.3, *df* = 1, *p* = .002), and a partner smoking during the pregnancy (Wilcoxon’s

TABLE 2. Ratings of Pregnancy and Health Attitudes by Expectant Fathers

Statement	Percent agree/ strongly agree	Percent disagree/ strongly disagree
I feel ready to accept the responsibilities of being a father	100	0
Men have an important role during their partners' pregnancy	99.3	0.7
I think it is important for a woman to breastfeed her baby	86.1	13.9
An unborn baby is protected from cigarette smoke	23.3	76.8
A pregnant woman's smoking will have a negative effect on her baby	78.2	21.8
I feel excluded by health care professionals on issues to do with the baby	19.5	80.5
Pregnancy improves a relationship between a man and a woman	89.8	10.4
I am worried about being a good father	50.7	49.3
Having a baby is very exciting	100	0
I would like more information about ways to improve my health	82.6	17.4
It is important for me to have a healthy diet	84.9	5.1
It is important for my partner to have a healthy diet	100	0
I am willing to change some of my health behaviors to help my partner change some of her health behaviors	97.8	2.2
I think having a baby is stressful	75.3	24.7
I think that seat belts save lives	92.7	7.3
I am confident in my ability to change unhealthy habits	92.8	7.2
Smoking near children or babies is okay	1.4	98.6
Drinking alcohol near children is okay	10.1	89.9
Children learn to be healthy more from their mothers than their fathers	43.5	56.5

TABLE 3. Health Risk Behaviors of Expectant Fathers

Risk behavior	n	Frequency (%)	95% CI	
			Lower limit	Upper limit
Smoking	68	49.3	40.7	57.9
Hazardous drinking	42	30.4	22.9	38.8
At-risk weight	58	42.0	33.7	50.3
At-risk nutrition	131	94.9	89.8	97.9
At-risk physical activity	38	27.5	20.3	35.8

Smoking: currently smoking either daily or on some days of the week; hazardous drinking: consuming five or more drinks on a drinking day in the past month; at-risk weight: at-risk for weight-related health problems is a BMI of 27.8 or greater; at-risk nutrition: eating less than five fruit or vegetable servings per day; at-risk physical activity: no physical activity outside of work in the past month.

rank sum = 4.3, $df = 1$, $p = .038$). In comparisons of total health risk behaviors with each of the beliefs/attitudes listed in Table 2, men with more health risk behaviors were more likely to disagree with the statement "I think that seat belts save lives" (Spearman's rank correlation coefficient $p = .013$). All other health-related statements in Table 2 as well as variables of marital status, place of residence (e.g., rural vs. nonrural), rating of health status, diagnosed medical problems, and parenting status (e.g., first time vs. other) were not significantly correlated.

Discussion

This study found men to indicate knowledge of health risk issues and support health behavior change during a partner's pregnancy. However, their knowledge and attitudes are incongruent with reported behavior. These men engage in high rates of health risk behaviors during pregnancy. The differences between attitudes/knowledge about health behaviors and reported behaviors represent a challenge for health care providers and public health advocates for interventions targeting men and women to improve the health of young adults during pregnancy.

The health risk behaviors observed in this sample are a reflection of a national trend toward greater health risk behaviors and reduced health status of men and women aged 18–44 over the past decade (Winkleby & Cubbin, 2004) and are also consistent with health disparities literature showing increased heart disease, cancer, and diabetes found in populations of lower income, lower educational attainment, and rural areas (National Center for Health Statistics, 2001). Hazardous drinking (five or more drinks on a drinking day in the past month) was higher in the

expectant fathers sample (30.4%) compared with national (24.9%) and Missouri (25.7%) data for all-age men.

About 85% of the expectant fathers reported more than one health risk behavior and about 48% of the men reported at least three of five assessed health risk behaviors; therefore, any provided intervention would need to consider issues related to addressing multiple health risk factors. A potential intervention might explicitly address risk factors based on their common clustering. For example, an intervention module could address smoking and problem drinking, while another module could intervene upon exercise, weight management, and nutrition behaviors. Another strategy would be to provide intervention for the risk behavior the expectant father is most interested in changing. A recent national study examining four risk behaviors (smoking, problem drinking, BMI/overweight, and exercise/inactivity) of all-age adults found that 58% had more than one health risk behavior. The combination of inactivity and overweight was the most common specific cluster of risk behaviors. Analyses found that age (younger adults), gender (male), mental distress (high distress), and education (less than high school) were predictors of individuals with three or four risk factors (Fine, Philogene, Gramling, Coups, & Sinha, 2004). A future study of expectant fathers, with a larger and more diverse sample, would allow for multivariate analyses to inform possible intervention strategies.

Low levels of fruit/vegetable intake are a common problem in this sample, with 95% eating fewer than the recommended five servings per day. Further, only 25% of the expectant fathers ate at least three servings per day compared with national samples in which about half of the men aged 18–44 eat at least three

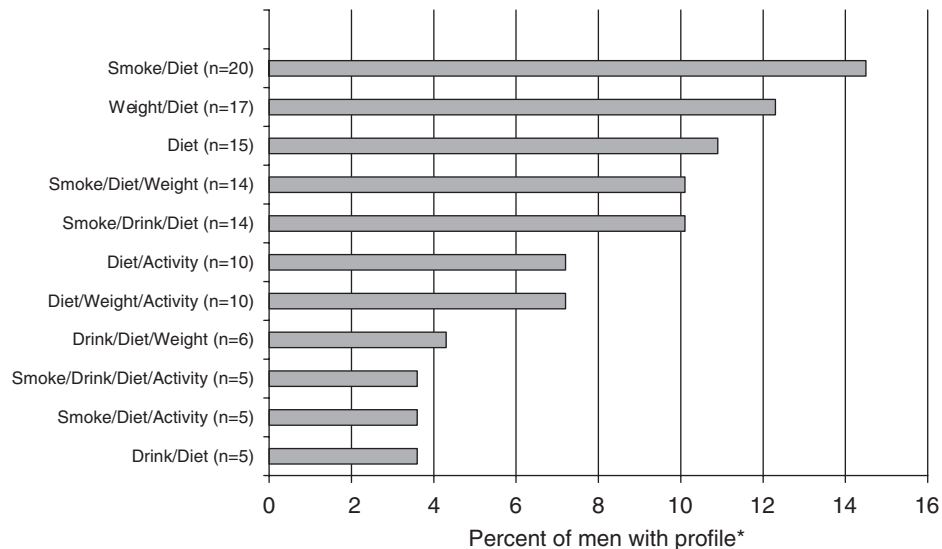


Figure 1. Ten Most Common Health Risk Behavior Profiles of Expectant Fathers.

Smoking: currently smoking either daily or some days of the week; drink: hazardous drinking, consuming five or more drinks on a drinking day in the past month; weight: at risk for weight-related health problems is a BMI of 27.8 or greater; diet: at-risk nutrition, eating less than five fruit or vegetable servings per day; activity: at-risk physical activity, no physical activity outside of work in the past month. *The 10 most frequent profiles represent 88% of the sample.

servings per day (Winkleby & Cubbin, 2004). Another group of men was also obese and with very low activity in this sample. These findings are of concern for the health of future families where parental nutritional and activity habits are predictors of childhood obesity (Cleland, Venn, Fryer, Dwyer, & Blizzard, 2005; Margetts, Thompson, Speller, & McVey, 1998). The degree to which expectant fathers' dietary habits affect the nutrition choices of pregnant partners is unknown. Given the importance of maternal nutrition for enhancing pregnancy outcomes, an examination of this relation is warranted in future research.

Almost half of the men in this sample are current smokers, compared with the national rate for all-age men of 25.7% and the Missouri state rate for all-age men of 29.6% (Centers for Disease Control and Prevention [CDC], 2003). Smoking by a male partner has been associated with continued smoking of pregnant partners and relapse during the pregnancy and postpartum of pregnant partners who do quit during the pregnancy (Fingerhut et al., 1990; Hakansson et al., 1999; Lu et al., 2001; McBride et al., 1998; Severson et al., 1997). Continued smoking by one or both partners postpartum creates increased risk for respiratory and other problems of infants and children in these homes (Adams, 2003). Further, the men in this study with higher numbers of risk factors were more likely to be partnered with women who had smoked within the past year. These findings, in addition to our previ-

ously reported findings that men appear to have high levels of readiness to quit smoking during pregnancy (Everett et al., 2005), indicate an opportunity and need to offer cessation options to men who smoke during pregnancy.

The period of pregnancy offers a challenging opportunity to provide health promotion intervention targeting men and couples. Pregnancy offers almost a full year of interaction with health care providers and can be a time when young adults may be receptive to information about health and safety. Prenatal screening is a standard process used to identify women with specific behaviors and conditions that increase the risk for problematic deliveries. Tailored case management is often provided for those at highest risk to improve pregnancy outcomes. A challenge is to change the prenatal health care paradigm to include both partners. For example, a screening process could be used to obtain information from male partners to address paternal risk behaviors most related to poor pregnancy outcomes. Our telephone survey study demonstrates that one method of "screening" men is possible during pregnancy. However, additional research is needed to enhance support for this paradigm shift, including examining any potential negative consequences of including prevention-oriented care for men during pregnancy.

This paradigm shift requires men to be targets of behavior change interventions during pregnancy,

unlike the current practice of focusing almost all health promotion conducted during pregnancy exclusively on the pregnant partner. If men's health risk behaviors are assessed, personalized health risk behavior feedback could be given, with particular emphasis on the importance of changing behaviors that complicate health outcomes for their partners and developing babies. This comprehensive approach to prenatal care would be consistent with recommendations to bring behavioral risk factor screening into the mainstream of primary care (Babor, Sciamanna, & Pronk, 2004; Coups, Gaba, & Orleans, 2004) and with developing a stronger link between primary care and public health interventions (Davis, 2005). Comprehensive reviews have validated the various levels of effectiveness of health promotion at worksites and in primary care (Aldana & Pronk, 2001; Lusk, 1997; Goldstein, Whitlock, DePue, & Planning Committee of the Addressing Multiple Behavioral Risk Factors in Primary Care Project, 2004; Pelletier, 2001). Recent studies have utilized telephone contact to provide multicomponent treatments to reduce several health risk behaviors of men and women with consideration for both the level of risk and the readiness of a person to make changes (Gold, Anderson, & Serxner, 2000; Strecher, Wang, Derry, Wildenhaus, & Johnson, 2002). This form of treatment during pregnancy seems particularly promising for addressing men and couples who live in rural areas, where access to on-site programs, attending daytime appointments, and travel to appointments are all problematic issues that would reduce intervention participation rates.

Limitations to our study are noted, particularly with regard to the generalizability of our findings. Firstly, we studied men who are living with their pregnant partners; therefore, findings may not generalize to pregnancy relationships where partners are not living together. Secondly, our low income, primarily rural, and White sample with low educational attainment have very high rates of health risk behaviors. Future studies with randomly selected samples of ethnically and economically diverse populations including urban residents would be helpful to characterize all expectant fathers' health behaviors more completely. Additionally, not all health risk behaviors were assessed in this study. Drug abuse, weapons in a household, and risky sexual behavior are behaviors that have been addressed through telephone interviews and are relevant to the well-being of

young families (Guagliardo, Huang, & D'Angelo, 1999; Holmberg & Berg-Kelly, 2002; Weinman, Smith, & Buzi, 2002). Another limitation relates to men who declined to be in our study as these men may represent the group that has the lowest level of readiness to address health risk behaviors or to participate in health behavior change interventions. Finally, this study did not address health risk behaviors through in-depth interviews, but instead relied on single-item self-report questions. While these items were modeled after the BRFSS questions, reliance on self-reports has been found to underestimate actual health risks (weight and smoking) in some circumstances (Winkleby & Cubbin, 2004). Further, in our survey of health attitudes and pregnancy statements (see Table 2), responses may not have represented deeply held beliefs and this would have implications for behavior change (Ajzen & Fishbein, 1980).

Future research should be directed at determining the treatment modality preferences of expectant fathers, their partners, and providers. What is needed is a better understanding of the precise health risk behaviors that can be effectively addressed during pregnancy. To address these issues, we are conducting ongoing studies with men during pregnancy and postpartum. These studies, using both qualitative and quantitative methods, will provide a richer understanding of men's behavior during pregnancy and how it relates to their partners' health behavior. Further, a randomized controlled trial is in progress testing smoking cessation interventions for both pregnant women and expectant fathers who smoke. An outcome of particular interest is whether providing treatment to the male partner will improve cessation outcomes for his pregnant partner, who will also receive treatment. The benefit of the new knowledge about health behavior interactions of couples from these and other studies can be used to design treatments to test the premise that a "teachable moment" extends to men and couples during pregnancy.

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