

Pregnancy Intentions and Happiness Among Pregnant Black Women at High Risk for Adverse Infant Health Outcomes

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CONTEXT: Unintended pregnancy is associated with risk behaviors and increased morbidity or mortality for mothers and infants, but a woman's feelings about pregnancy may be more predictive of risk and health outcomes than her intentions.

METHODS: A sample of 1,044 black women who were at increased risk were enrolled at prenatal care clinics in the District of Columbia in 2001–2003. Bivariate and multivariate analyses assessed associations between pregnancy intentions or level of happiness about being pregnant and multiple psychosocial and behavioral risk factors, and identified correlates of happiness to be pregnant.

RESULTS: Pregnancy intentions and happiness were strongly associated, but happiness was the better predictor of risk. Unhappy women had higher odds than happy women of smoking, being depressed, experiencing intimate partner violence, drinking and using illicit drugs (odds ratios, 1.7–2.6). The odds of being happy were reduced among women who had other children or a child younger than two, who were single or did not have a current partner, who had had more than one sexual partner in the past year and who reported that the baby's father did not want the pregnancy (0.3–0.6). In contrast, the odds of being happy were elevated among women who had better coping strategies (1.03), who had not used birth control at conception (1.6) and who had 1–2 household members, rather than five or more (2.1).

CONCLUSIONS: Additional psychosocial screening for happiness about being pregnant and for partner characteristics, particularly the father's desire to have this child, may help improve prenatal care services and prevent adverse health outcomes.

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Much has been written about the concept of intendedness of pregnancy.^{1–5} Previous research has consistently found pregnancy intendedness to be associated with several behavioral and psychosocial risk factors that may influence child health outcomes. Unintended or unwanted pregnancies have been associated with high-risk health behaviors during pregnancy, such as continued smoking,^{6,7} alcohol use,⁶ and later initiation of prenatal care and fewer prenatal visits.^{8–12} Women with unintended or unwanted pregnancies are more likely to report depression or anxiety during pregnancy and the postpartum period than are women with intended or wanted pregnancies.^{13–15} Risky behaviors are more common among women with mistimed than intended pregnancies, and are most common among women whose pregnancies are unwanted.¹⁶ Perhaps as a direct result, women with unwanted pregnancies are at greater risk of having poor pregnancy outcomes than are those with intended or mistimed pregnancies.^{17–21}

However, terminology and strategies for grouping women for analytic purposes have been inconsistent.^{2,22} Most research has used one measure to assess intendedness, wantedness or timing. For example, some studies have compared intended with unintended (i.e., mistimed and unwanted) pregnancies, thus leaving the mistimed

category inadequately explained.^{2,22} Others have compared intended with unwanted pregnancies and found increased rates of high-risk behaviors and poorer prenatal care utilization among women with the latter.^{6,16,23–25} Still other studies have suggested the need to distinguish between pregnancy intentions and a woman's feelings about her pregnancy, which may be a stronger predictor of risk.^{2,26–28} Thus, while all of these variables are interrelated, there are distinctions in measurement and meaning that are not fully understood.^{3,29–31}

Relatively few studies have examined a woman's level of happiness about being pregnant, compared happiness to pregnancy intentions or looked at associations between happiness and maternal health behaviors or pregnancy outcomes. Some studies have found stronger associations between happiness and pregnancy outcomes such as low birth weight than between intention and outcomes,^{11,12,21,31} but we are not aware of any studies that examined associations between happiness and risk factors for poor pregnancy outcomes, or that sought to identify other correlates of happiness. And although happiness correlates strongly with intendedness,^{5,22,27,31} happiness and intendedness are not synonymous and may be measuring slightly different constructs. It is important to elaborate these distinctions,

since differentiation between the two could have implications for the provision of prenatal care²⁷ and, potentially, pregnancy outcomes.

The purposes of the current study were to determine whether an association exists between pregnancy intentions and happiness, to assess the relative importance of each in predicting psychosocial and behavioral risk factors, and to identify correlates of maternal happiness about pregnancy.

METHODS

This study is part of the NIH-DC Initiative, a congressionally mandated project designed to reduce infant morbidity and mortality in the District of Columbia. The study was approved by the institutional review boards of all participating institutions.*

Design and Procedures

We present baseline data collected for Healthy Outcomes of Pregnancy Education (DC-HOPE), a multicomponent intervention designed to address four behavioral and psychosocial risks during pregnancy: cigarette smoking, environmental tobacco smoke exposure, depression and intimate partner violence.

Women were recruited at six prenatal care clinics during regularly scheduled visits between July 2001 and October 2003. They completed a 10-minute, audio computer-assisted self-interview (audio-CASI) screening assessment to determine their study eligibility and risk status. To be eligible, respondents had to identify themselves as black, African American or Latina, reside in the District of Columbia, be at least 18 years old, speak English, receive prenatal care at a participating clinic, enroll in the study by 28 weeks' gestation and report at least one of four designated psychosocial and behavioral risk factors for poor pregnancy outcomes (cigarette smoking, exposure to environmental tobacco smoke, depression, intimate partner violence).[†] Screening instruments included the Beck Depression Inventory–Fast Screen,^{32,33} the Abuse Assessment Screen³⁴ and items adapted from the Smoke-Free Families screen.³⁵ Eligible women who consented to participate completed a telephone baseline questionnaire 3–4 weeks after screening, and then were randomized to receive either an integrated intervention for multiple risk factors or usual prenatal

care. Details on screening, eligibility, recruitment and randomization for DC-HOPE are reported elsewhere.³⁶

Of 1,398 eligible women, 85% agreed to participate; 90% of these women were contacted and completed the baseline interview. Because of the small number of

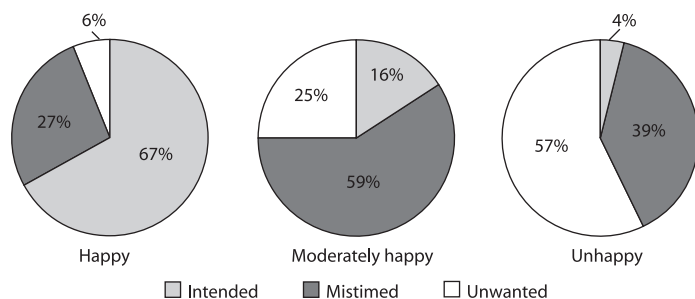
TABLE 1. Selected characteristics of black women aged 18 or older who received care at six prenatal clinics, District of Columbia, 2001–2003

Characteristic	Mean or % (N=1,013)
MEANS	
Maternal age (years)	25.1 (5.4)
Gestational age at baseline survey (weeks)	19.1 (6.9)
PERCENTAGE DISTRIBUTIONS	
Education	
<H.S. degree	30
H.S. graduate/GED	47
≥some college	23
Employment status	
Working full-time or part-time	38
Not working, worked before pregnancy	36
Not working, did not work before pregnancy	26
Household member receives Medicaid	
Yes	78
No	22
Marital/relationship status	
Single	72
Married/cohabiting	24
Separated/divorced	5
Partner status	
Partner is father of baby	78
Partner is not father of baby	4
No partner	18
Has other children	
Yes	68
No	32
Used family planning at time of conception	
Yes	23
No	77
Pregnancy intention	
Intended	34
Mistimed	42
Unwanted	24
Happiness about being pregnant	
Happy	41
Moderately happy	40
Unhappy	19
Total	100
PERCENTAGES	
Psychosocial and behavioral risk factors	
Cigarette smoking in past week	18
Environmental tobacco smoke exposure in past week	57
Depression in past month	44
Intimate partner violence perpetrated by partner in past year	32
Intimate partner violence perpetrated by partner or self during pregnancy	17
Alcohol use during pregnancy	22
Illicit drug use during pregnancy	12

Notes: Figures in parentheses are standard deviations. Percentages may not total 100 because of rounding.

*Collaborating institutions include the Children's National Medical Center, George Washington University Medical Center, Georgetown University Medical Center, Howard University Hospital, the National Institute of Child Health and Human Development, and RTI International.

†At audio-CASI screening, 48% of respondents said they had smoked cigarettes within six months of becoming pregnant, 83% said they had been exposed to environmental tobacco smoke during their pregnancy, 36% reported depression symptoms in the past month and 21% reported intimate partner violence perpetrated by a partner in the prior year. There was considerable overlap in risk factors—40% of respondents reported one risk factor, 37% reported two, 17% reported three and 6% reported all four.

FIGURE 1. Percentage distribution of respondents, by pregnancy intention, according to level of happiness about being pregnant

Latinas in the sample (26), our analyses include only black participants who answered questions related to happiness or pregnancy intentions (N=1,013 and 1,007, respectively).

Measures

•**Pregnancy intention and happiness.** The baseline interview included items adapted from the Pregnancy Risk Assessment Monitoring System and the National Survey of Family Growth (NSFG).^{37,38} Pregnancy intention was derived from the following closed-ended questions: “Were you using any family planning methods to prevent pregnancy the month before you became pregnant this time?” Women who answered no were then asked if the reason for not using a method was that they had wanted to become pregnant. Those who again answered no, or who said they had used a method, were asked “At the time you became pregnant, did you yourself actually want to have a(nother) baby at *some* time?” A follow-up probe for those who said they were not sure ascertained whether the answer to the preceding question was “probably yes,” “probably no” or “didn’t care.” Finally, all respondents who said they wanted to become pregnant at some time were asked “Did you become pregnant sooner than you wanted, later than you wanted, or at about the right time?” (The other option was “didn’t care.”)

Answers to these questions were used to derive three independent variables reflecting a woman’s pregnancy intention. The first was a three-level variable of pregnancy intendedness: intended, mistimed or unwanted. Consistent with the NSFG definitions,⁵ a pregnancy was classified as intended if a woman had wanted to conceive when she did or earlier; mistimed if she had wanted to get pregnant at some time, but had conceived sooner than she wanted; and unwanted if she had not wanted to get pregnant at any time. The other two variables were dichotomous: intended versus unintended (including mistimed and unwanted) pregnancy and unwanted versus wanted (including intended and mistimed) pregnancy.

A fourth independent variable was derived from an NSFG item measuring happiness about being pregnant: Women were asked which number between 1 (indicating “very unhappy”) and 10 (“very happy”) best described

how they felt when they found out they were pregnant. Women were classified into three groups on the basis of their responses: happy (8–10), moderately happy (4–7) and unhappy (1–3) about being pregnant.

•**Psychosocial and behavioral risk factors.** Seven dependent variables reflecting psychosocial and behavioral risk factors were assessed at baseline. Self-reported depression within the past month was measured using the 20-item Hopkins Symptom Checklist–Depression Scale. Respondents rated the extent to which they were distressed by each symptom (e.g., poor appetite, feeling lonely or blue, restless sleep, thoughts of death or dying) on a five-point scale from “not at all” to “extremely distressed.” Responses were summed and divided by 20, and resulting scores were classified into four groups; a score greater than 0.75 reflected mild, moderate or severe depression.^{39–41}

The Conflict Tactics Scale^{42–44} was used to measure the annual frequency of physical assault and sexual coercion perpetrated by the woman or her partner. The annual partner-perpetrated assault and coercion variables were collapsed into a single score reflecting any intimate partner violence (by the partner) in the past year. A single item followed this scale and assessed whether intimate partner violence had occurred during pregnancy (perpetrated by the woman or her partner).

Behavioral risks were any alcohol or illicit drug use during pregnancy (as measured by items adapted from the NSFG and other national surveys), as well as cigarette smoking or exposure to environmental tobacco smoke in the past week (as measured by items from the Smoke-Free Families questionnaires).³⁵

•**Correlates of happiness.** Variables used to assess predictors of happiness about being pregnant were classified into three categories: demographic and intrapersonal characteristics, reproductive history and related characteristics, and interpersonal relationships and support.

The demographic and intrapersonal characteristics examined were age, education level, employment status, income, number of household members, and household receipt of Medicaid. We used a 15-item, short version of the Negative Mood Regulation Scale^{45–47} to measure cognitive and behavioral coping strategies for dealing with negative affect or mood states (e.g., “When I’m upset, I believe that telling myself it will pass will help me calm down” and “When I’m upset, I believe that going out to dinner with friends will help me feel better”). Each item was rated on a five-point scale from “strongly agree” to “strongly disagree”; negatively worded items were reverse-coded, and a higher summary score (range, 15–75) indicated better coping strategies.

The reproductive history and related variables we assessed were gestational age at baseline survey and at first prenatal care visit; numbers of pregnancies (including the current one), live births, low-birth-weight infants, abortions and previous pregnancy complications (i.e., miscarriages, stillbirths); pregnancy loss ratio (i.e., a

woman's number of miscarriages, stillbirths and abortions divided by her number of pregnancies, with higher scores indicating greater loss); number of living children and whether the woman had a child younger than two; use of a family planning method at conception; pregnancy attitudes; and reproductive health knowledge.

Pregnancy attitudes were assessed using eight items: the four NSFG questions (out of 10) on ambivalence about pregnancy³⁸ that had performed most consistently in previous analyses,⁵ and four new items developed to reflect attitudes identified during the intervention pilot study conducted in this population. Each of these items was rated on a scale of 1 ("strongly disagree") to 10 ("strongly agree"). Factor analyses and Cronbach's alpha coefficients were computed (with negative items reverse-coded) to determine how to best characterize attitudes toward pregnancy within this population. We present both an overall positive attitude scale for all eight items, with higher values indicating more positive attitudes (range, 8–80; alpha, 0.7), and two subscales. The first subscale comprised three items about worry and concern, with higher values indicating greater worry or concern (range, 3–30; alpha, 0.6): "I thought that having a baby would keep me from doing the things that I wanted to in my life (like working, going to school, going out and so on)"; "I was worried that I did not have enough money to take care of this baby"; and "I thought that having a(nother) baby would be more than I could handle." The second subscale consisted of three items about looking forward to the future, for which higher values indicated that the respondent was more positive about the future (range, 3–30; alpha, 0.6): "I looked forward to the new experiences that having a baby would bring"; "I looked forward to buying and getting things for a new baby"; and "I looked forward to the father, the baby and I being a family together." Two items asking how partners and others felt about the pregnancy were not sufficiently correlated to justify combining them into a third subscale (r , 0.1; alpha, 0.2), but these were included in the overall positive attitude scale: "I thought my partner would not want me to have this baby" and "I thought that my family and friends would be happy that I was pregnant."

Reproductive health knowledge was assessed by 10 items (possible responses were "true," "false" and "don't know"). Six focused on knowledge of STDs (e.g., "For most sexually transmitted diseases, women usually get early symptoms or warning signs"), three on pregnancy spacing (e.g., "A woman who becomes pregnant within one year of having a child is more likely to have a lower weight baby") and one on the timing of conception ("The time women can get pregnant occurs on only one day in each menstrual cycle"). Responses were recoded as correct or incorrect (which included "don't know") and summed. Psychometric analyses (principal components, exploratory factor and Cronbach's alpha) did not support the creation of subscales, so only the full scale was used (range, 1–10; alpha, 0.4).

TABLE 2. Percentage of respondents reporting selected behavioral and psychosocial risk factors, by their level of happiness about being pregnant and their pregnancy intention

Risk factor	Level of happiness/intention			
Happiness about being pregnant	Total (N=1,013)	Happy (N=410)	Moderately happy (N=406)	Unhappy (N=197)
Cigarette smoking in past week**	18	16	17	26
Environmental tobacco smoke exposure in past week*	57	60	58	48
Depression in past month***	44	37	43	60
Intimate partner violence perpetrated by partner in past year**	32	27	33	40
Intimate partner violence perpetrated by partner or self during pregnancy	17	15	17	21
Alcohol use during pregnancy**	22	17	24	26
Illicit drug use during pregnancy*	12	9	13	16
Pregnancy intention	Total (N=1,007)	Intended (N=347)	Mistimed (N=423)	Unwanted (N=237)
Cigarette smoking in past week***	18	16	15	28
Environmental tobacco smoke exposure in past week	57	60	58	51
Depression in past month	44	39	47	46
Intimate partner violence perpetrated by partner in past year	32	30	32	35
Intimate partner violence perpetrated by partner or self during pregnancy	17	17	16	19
Alcohol use during pregnancy	21	18	23	23
Illicit drug use during pregnancy	12	10	12	14
Intended vs. unintended pregnancy	Total (N=1,007)	Intended (N=347)	Unintended (N=660)	
Cigarette smoking in past week	18	16	19	
Environmental tobacco smoke exposure in past week	57	60	56	
Depression in past month*	44	39	46	
Intimate partner violence perpetrated by partner in past year	32	30	33	
Intimate partner violence perpetrated by partner or self during pregnancy	17	17	17	
Alcohol use during pregnancy*	21	18	23	
Illicit drug use during pregnancy	12	10	13	
Wanted vs. unwanted pregnancy	Total (N=1,013)	Wanted (N=770)	Unwanted (N=237)	
Cigarette smoking in past week***	18	15	28	
Environmental tobacco smoke exposure in past week*	57	59	51	
Depression in past month	44	43	46	
Intimate partner violence perpetrated by partner in past year	32	31	35	
Intimate partner violence perpetrated by partner or self during pregnancy	17	16	19	
Alcohol use during pregnancy	21	21	23	
Illicit drug use during pregnancy	12	11	14	

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. Note: Significance levels are based on chi-square tests and refer to the overall differences among levels of happiness or intention for each risk factor.

The interpersonal relationship and support items examined were marital status, number of sexual partners in the past year, whether the current partner (if any) is the baby's father, the father's desire for the pregnancy and his provision of emotional support, the extent of emotional support from the current partner or others, the frequency of intimate partner violence in the past year and receipt of risk factor-related and psychosocial services.

A single item was used to measure the extent of the father's emotional support (using a five-point scale from "not at all" to "extremely supportive"). The 11-item short

TABLE 3. Adjusted odds ratios (and 95% confidence intervals) from logistic regression analysis assessing the association between level of happiness about being pregnant or pregnancy intention and selected risk factors

Risk factor	Odds ratio	
Happiness about being pregnant	Moderately happy vs. happy	Unhappy vs. happy
Cigarette smoking in past week*	1.25 (0.84–1.84)	1.88 (1.20–2.94)
Environmental tobacco smoke exposure in past week*	0.89 (0.67–1.20)	0.62 (0.44–0.89)
Depression in past month***	1.27 (0.95–1.69)	2.55 (1.78–3.64)
Intimate partner violence perpetrated by partner in past year**	1.28 (0.95–1.74)	1.77 (1.23–2.55)
Intimate partner violence perpetrated by partner or self during pregnancy	1.16 (0.79–1.70)	1.49 (0.95–2.34)
Alcohol use during pregnancy**	1.81 (1.26–2.59)	1.85 (1.21–2.84)
Illicit drug use during pregnancy†	1.54 (0.98–2.44)	1.71 (1.00–2.92)
Pregnancy intention	Mistimed vs. intended	Unwanted vs. intended
Cigarette smoking in past week**	1.14 (0.75–1.73)	1.85 (1.20–2.86)
Environmental tobacco smoke exposure in past week	0.85 (0.63–1.15)	0.70 (0.50–1.00)
Depression in past month	1.38 (1.02–1.86)	1.35 (0.95–1.90)
Intimate partner violence perpetrated by partner in past year	1.01 (0.74–1.39)	1.26 (0.88–1.81)
Intimate partner violence perpetrated by partner or self during pregnancy	0.97 (0.65–1.45)	1.17 (0.75–1.83)
Alcohol use during pregnancy*	1.64 (1.13–2.39)	1.38 (0.90–2.12)
Illicit drug use during pregnancy	1.14 (0.71–1.82)	1.13 (0.67–1.91)

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. †When gestational age was not controlled for, odds ratios were statistically significant overall. Notes: Significance levels refer to the overall differences among levels of happiness or intention for each risk factor. Analysis controlled for maternal age, gestational age, education and employment status.

version of the Support Behaviors Inventory assessed a woman's satisfaction with the emotional support from her current partner (whether or not the partner was the baby's father) and others.⁴⁸ (Sample items measured the woman's satisfaction with the degree to which her partner "shows interest in my daily activities and problems" and "tolerates my ups and downs and unusual behaviors.") Items were rated on a six-point scale from "very dissatisfied" to "very satisfied." Separate scales were created to reflect support from partners and from others; both demonstrated high internal consistency reliability (range, 11–66; alpha, 0.9). Exploratory and confirmatory factor analyses indicated that the items grouped together into one factor, and factor loadings were high (0.7–0.9 for partners, and 0.8–0.9 for others). For the multivariate analysis of a woman's satisfaction with partner support, we shifted the scale to 0–5 and gave women who had no partner the lowest score (range, 0–55).

Four summary scores were created from the Conflict Tactics Scale (described earlier) to assess the annual frequency of physical assault and sexual coercion; for each type of aggression, we looked at whether the partner or the woman had perpetrated the aggression. Women were also asked whether they had personally received services related to any risk factor (smoking cessation, treatment of depression, interventions targeting family violence or family planning; range, 0–4) or to other psychosocial needs (home visits, alcohol or drug treatment, or support from a social worker or counselor; range, 0–5) in the past year.

Analysis

We hypothesized that there would be strong associations between pregnancy intentions and happiness, and that women who were unhappy about being pregnant and those who had unwanted pregnancies would be at greater psychosocial and behavioral risk than women who were happy and those who had intended pregnancies, respectively. We also hypothesized that happiness about a pregnancy would be a stronger predictor of risks during pregnancy than pregnancy intention.

Spearman correlation coefficients were used to assess associations between the three-level pregnancy intention and happiness variables. Chi-square tests and multivariate logistic regression models controlling for maternal age, education, employment status and gestational age were used to examine associations between intention and happiness and the seven psychosocial and behavioral risk factors.

The analysis of correlates of happiness was performed in three stages. First, bivariate comparisons of the happiness variable and the independent variables were conducted using chi-square tests and analysis of variance. Classification and regression trees^{49,50} were used to assess the importance of the independent variables and relationships between variables that were strongly associated with happiness. Correlation analyses were then performed to reduce the number of independent variables and to avoid multicollinearity in the models. At the second stage, initial multivariate logistic regression models were developed to identify characteristics that were independently associated with happiness about being pregnant. Variables that were significant in bivariate comparisons at $p \leq .20$ were included in three models (some were excluded to reduce multicollinearity): demographic and intrapersonal characteristics, reproductive history and related characteristics, and interpersonal relationships and support. At the last stage, variables significant at $p \leq .20$ in the initial models were analyzed in a multivariate model with a sample of 989 women (24 respondents were excluded because of missing responses). All models used a dichotomous happiness variable (unhappy vs. happy and moderately happy combined) and controlled for maternal age, education and employment status. None of the Hosmer and Lemeshow goodness-of-fit test p values was .05 or less.

RESULTS

Sample Characteristics

Among the 1,013 women in the sample, the mean age at baseline was 25 (range, 18–52), and the mean gestational age was 19 weeks (range, 3–38—Table 1, page 195). Seventy percent had at least a high school education, 38% were employed and 78% received Medicaid. A large majority of women were single, 24% were married or living with a partner, and 5% were separated or divorced. Seventy-eight percent stated that their current partner was the baby's father, 4% were with a different partner and 18% had no current partner.

Seven in 10 respondents had other children, and three-fourths had not used any family planning method at the time of conception. Thirty-four percent had intended to become pregnant when they did; 42% became pregnant sooner than they had wanted and 24% had not wanted a pregnancy at any time. Forty-one percent of women reported that they were happy about being pregnant, 40% were moderately happy and 19% were unhappy.

At baseline, 18% of respondents had smoked cigarettes in the past week, 57% had been exposed to environmental tobacco smoke in the past week and 44% reported having been depressed in the past month. Thirty-two percent of women reported physical or sexual intimate partner violence perpetrated by a partner in the past year, and 17% reported violence perpetrated by either a partner or herself during the pregnancy. Twenty-two percent of respondents had used alcohol during the pregnancy, and 12% had used illicit drugs in this period.

Pregnancy Intention, Happiness and Risk Behaviors

A woman's happiness about being pregnant was significantly associated with pregnancy intention (correlation coefficient, 0.6; $p < .05$). Sixty-seven percent of women who were happy to be pregnant had intended to become pregnant at the time they did, compared with 16% of those who were moderately happy and 4% of those who were unhappy (Figure 1, page 196). Twenty-seven percent of women who were happy to be pregnant had a mistimed pregnancy; in contrast, 59% of women who were moderately happy and 39% of those who were unhappy reported having a mistimed pregnancy. Finally, 6% of women who were happy to be pregnant had an unwanted pregnancy, compared with 25% of those who were moderately happy and 57% of those who were unhappy.

In bivariate comparisons, a woman's happiness about being pregnant was strongly associated with behavioral and psychosocial risk (Table 2, page 197). Significantly higher proportions of women who were unhappy to be pregnant than of those who were moderately happy or happy reported five of the seven risk factors: having smoked cigarettes in the past week (26% vs. 16–17%), having been depressed in the past month (60% vs. 37–43%), having experienced intimate partner violence in the past year (40% vs. 27–33%), and having drunk alcohol (26% vs. 17–24%) or used illicit drugs (16% vs. 9–13%) during pregnancy. In contrast, exposure to environmental tobacco smoke in the past week was less common among women who were unhappy to be pregnant than among those who were moderately happy or happy (48% vs. 58–60%).

Pregnancy intention had fewer associations with the various risk factors. A higher proportion of women with unwanted pregnancies than of those with intended or mistimed pregnancies had smoked in the past week (28% vs. 15–16%). Women with unintended pregnancies were at greater risk than those with intended pregnancies of having been depressed in the past month (46% vs. 39%) or having drunk alcohol during their pregnancy (23% vs.

TABLE 4. Selected demographic and intrapersonal characteristics of respondents, by level of happiness about being pregnant

Characteristic	Total (N=1,013)	Happy (N=410)	Moderately happy (N=406)	Unhappy (N=197)
PERCENTAGE DISTRIBUTIONS				
Maternal age*				
18–20	26	26	29	23
21–25	38	38	41	34
26–30	22	21	20	24
≥31	14	15	10	18
No. of household members**				
1–2	24	28	25	15
3–4	43	42	45	44
≥5	33	30	31	42
Education				
<H.S. degree	30	30	29	30
H.S. graduate/GED	47	49	47	43
≥some college	23	21	24	27
Employment status				
Working full-time	23	24	23	20
Working part-time	15	15	15	14
Not working, worked before pregnancy	36	36	37	36
Not working, did not work before pregnancy	26	25	26	30
Household member receives Medicaid				
Yes	78	75	79	81
No	22	25	21	19
Total	100	100	100	100
MEAN				
Cognitive/behavioral coping with negative moods and affect (range, 15–75)***	58.79 (9.73)	60.42 (9.16)	58.35 (10.19)	56.32 (9.32)

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. Notes: Significance levels are based on chi-square tests or analysis of variance and refer to the overall differences among levels of happiness for each characteristic. Percentages may not total 100 because of rounding. Figures in parentheses are standard deviations.

18%). Finally, a larger proportion of women reporting an unwanted pregnancy than of those reporting a wanted pregnancy had smoked cigarettes in the past week (28% vs. 15%), whereas a smaller proportion had been exposed to environmental tobacco smoke (51% vs. 59%).

Multivariate findings confirmed many of the bivariate findings; most of the significant differences were between women who were unhappy and those who were happy about being pregnant (Table 3). Compared with the latter women, the former had higher odds of having smoked cigarettes in the past week (odds ratio, 1.9), having drunk alcohol (1.9) or used illicit drugs (1.7) during pregnancy, having been depressed in the past month (2.6) or having experienced intimate partner violence in the past year (1.8); they had reduced odds of having been exposed to environmental tobacco smoke (0.6). Only one comparison between moderately happy and happy women reached significance: The odds of having drunk alcohol during pregnancy were elevated for those who were moderately happy (1.8).

In multivariate comparisons of pregnancy intention, there was less consistency, and fewer comparisons were

TABLE 5. Selected reproductive history and related characteristics of respondents, by level of happiness about being pregnant

Characteristic	Total	Happy	Moderately happy	Unhappy
PERCENTAGE DISTRIBUTIONS				
No. of pregnancies***				
1	17	19	18	9
2	22	24	22	17
3	18	18	18	19
4–5	25	25	24	25
≥6	19	14	18	29
Previous pregnancy complication**,†				
Yes	41	48	37	35
No	59	52	63	65
No. of living children***				
0	33	40	34	15
1	31	31	29	34
2–3	28	22	29	37
≥4	9	7	9	14
Has child aged <2***				
Yes	16	10	15	31
No	84	90	85	69
Used family planning at time of conception***				
Yes	23	16	26	32
No	77	84	74	68
Total	100	100	100	100
MEANS				
Gestational age (weeks)				
At baseline survey**	19.1 (6.9)	18.6 (6.9)	18.8 (6.6)	20.7 (7.5)
At first prenatal visit***	11.3 (5.9)	9.9 (5.0)	11.3 (5.5)	13.2 (7.1)
Pregnancy loss ratio***,†	0.45 (0.36)	0.50 (0.38)	0.45 (0.36)	0.37 (0.33)
Pregnancy attitude				
Overall positive attitude (range, 8–80)***	56.67 (14.51)	65.47 (10.31)	54.55 (12.00)	42.46 (13.96)
Worry/concern (range, 3–30)***	14.81 (8.10)	11.15 (7.09)	15.95 (7.20)	20.08 (8.24)
Looking forward to the future (range, 3–30)***	24.06 (6.43)	27.27 (3.75)	23.55 (5.73)	18.44 (7.93)
Reproductive health knowledge (range, 0–10)	5.97 (1.76)	5.82 (1.78)	6.06 (1.72)	6.09 (1.78)

p≤.01. *p≤.001. †Among women with earlier pregnancies. Notes: Significance levels are based on chi-square tests or analysis of variance and refer to the overall differences among levels of happiness for each characteristic. Percentages may not total 100 because of rounding. Figures in parentheses are standard deviations.

significant. The odds of cigarette smoking were higher among women with unwanted versus intended pregnancies (odds ratio, 1.9), and the odds of being depressed (1.4) and drinking alcohol (1.6) were elevated among those with mistimed pregnancies. In multivariate comparisons of women with intended versus those with unintended pregnancies (not shown), the latter had increased odds of drinking during pregnancy (1.5; p<.01) and of being depressed in the past month (1.4; p<.05). In comparisons of women with wanted versus those with unwanted pregnancies, the latter were at increased risk for smoking (1.7; p<.0001). No other risk factor comparisons were associated with intention.

Correlates of Happiness

Once we determined that happiness about being pregnant was strongly associated with more behavioral and psychosocial risk factors than was pregnancy intention,

we sought to identify the independent correlates of happiness.

Levels of education, employment status and household receipt of Medicaid were similar regardless of women's feelings about being pregnant (Table 4, page 199). In general, unhappy women were slightly older and lived in households with more members. Women who were happy were likely to use a greater range of cognitive and behavioral coping strategies to deal with negative affect or mood states than were those who were moderately happy or unhappy.

Reproductive history and related characteristics were strongly associated with happiness about being pregnant (Table 5). Compared with women who were happy or moderately happy to be pregnant, those who were unhappy were likely to have had more pregnancies, to have more living children or a child younger than age two, to have reported later gestational age at both first prenatal visit and baseline survey, and to have used a contraceptive method at the time of conception. Among respondents with prior pregnancies, a higher proportion of those who were happy about being pregnant than of those who were moderately happy or unhappy had experienced a prior pregnancy complication or pregnancy loss. As might be expected, the attitudes of unhappy women toward this pregnancy were less positive: They had lower scores for overall positive attitude and optimism for the future than did happy or moderately happy women, and a higher score for worry and concern about having a baby.

The quality of interpersonal relationships and the extent of emotional support were also significantly associated with women's happiness about being pregnant (Table 6). Unhappy women were more likely than others to be single, to have had two or more sexual partners in the past year and to have no current partner; they also had had more experiences of sexual coercion in the past year. Lower proportions of unhappy women reported that their current partner was the father of this baby, that the baby's father desired the pregnancy and that he was extremely emotionally supportive. Furthermore, unhappy women were less satisfied with the emotional support received from partners and others, and they had a greater likelihood of having received any services related to risk factors or other psychosocial needs in the past year.

All variables in Table 4 except receipt of Medicaid were included in the initial regression model of demographic and intrapersonal characteristics. Several variables in Table 5 were excluded from the initial model of reproductive history and related characteristics: gestational age at first prenatal visit (because gestational age at baseline was included), number of pregnancies and having previous pregnancy complications (because pregnancy loss ratio and number of living children were included), and all of the pregnancy attitude scales (because of their strong correlation with happiness). Two variables in

Table 6 were excluded from the initial model of interpersonal relationship and support characteristics because of their strong correlation with the father's desire for the pregnancy: emotional support from the partner and from the baby's father.

In the final multivariate model (Table 7, page 202), the odds of being happy to be pregnant were elevated among women with less than a college education (odds ratios, 2.5 for women with less than a high school degree and 2.0 for high school graduates), and were higher among those living in households with 1–2 members than among those whose households consisted of five or more (2.1). The odds of being happy also increased with women's use of positive cognitive and behavioral coping strategies to deal with negative moods or affect (1.03). Three reproductive characteristics were associated with reduced odds of being happy to be pregnant: increased gestational age at enrollment (0.97), having other children (0.3–0.4) and having a child younger than two (0.4). The likelihood of being happy was elevated among women who had not used a birth control method at the time they became pregnant (1.6). Several interpersonal characteristics were also significant correlates of a woman's happiness about being pregnant: Odds were reduced among women who were single, who had had more than one sexual partner in the past year, who did not have a current partner and who reported that the baby's father did not want this pregnancy (0.4–0.6).

DISCUSSION

Measures of happiness about being pregnant, or a partner's happiness, may yield stronger associations with prenatal care initiation or utilization, and pregnancy outcomes (e.g., low birth weight, prematurity, infant death), than traditional measures reflecting pregnancy intentions or timing.^{11,12,21,51} And while previous studies have compared pregnancy intentions with happiness, we are not aware of any studies that have assessed associations between feelings about pregnancy and maternal risk behaviors, or that have identified correlates of happiness about pregnancy.

As in previous research,^{5,22,27,31} pregnancy intentions and happiness were strongly correlated in this study. Women who were happy to be pregnant were most likely to have an intended pregnancy, those who were moderately happy were most likely to have a mistimed pregnancy and those who were unhappy were most likely to have an unwanted pregnancy. However, one-third or more of women in each happiness category reported intentions that were not consistent. Thus, these two variables are not interchangeable and may be measuring different, yet strongly related constructs, as has been suggested elsewhere.^{22,27,31}

We also demonstrated that happiness to be pregnant was strongly associated with more psychosocial and behavioral risk factors than was pregnancy intention. These findings support pregnancy outcome data,^{21,51} and

TABLE 6. Selected interpersonal relationship and support characteristics of respondents, by level of happiness about being pregnant

Characteristic	Total	Happy	Moderately happy	Unhappy
PERCENTAGE DISTRIBUTIONS				
Marital/relationship status***				
Single	72	66	74	80
Married/cohabiting	24	30	22	14
Separated/divorced	5	4	4	6
No. of sexual partners in past year***				
1	68	72	68	59
2	21	16	24	24
≥3	11	12	7	17
Partner status***				
Partner is father of baby	78	85	77	64
Partner is not father of baby	4	3	4	7
No partner	18	12	19	30
Father desires pregnancy***				
Yes	82	91	81	66
No	9	5	8	20
Don't know/not sure	9	5	11	14
Father is supportive***				
Extremely	37	48	34	24
Very	30	29	32	28
Somewhat	17	12	19	23
Not at all/not very	15	10	15	25
Total	100	100	100	100
MEANS				
Satisfaction with emotional support				
From partner (range, 0–55)***	36.90 (20.58)	41.76 (18.17)	36.03 (20.71)	28.58 (22.16)
From anyone other than partner (range, 11–66)*	40.08 (14.87)	41.31 (14.93)	39.92 (14.49)	37.84 (15.30)
Frequency of sexual coercion in past year				
By partner*	1.98 (7.94)	1.49 (7.05)	1.88 (7.20)	3.18 (10.62)
By self	1.00 (4.36)	1.26 (5.24)	0.74 (3.33)	0.97 (4.20)
Received services in past year				
For any risk factor (range, 0–4)*	0.11 (0.36)	0.09 (0.31)	0.10 (0.37)	0.17 (0.43)
Other psychosocial (range, 0–5)*	0.24 (0.61)	0.20 (0.57)	0.23 (0.57)	0.34 (0.73)

*p≤.05. ***p≤.001. Notes: Significance levels are based on chi-square tests or analysis of variance and refer to the overall differences among levels of happiness for each characteristic. Percentages may not total 100 because of rounding. Figures in parentheses are standard deviations.

further suggest that a woman's feelings about her pregnancy may be a stronger determinant of psychosocial or behavioral risk during pregnancy than pregnancy intentions or timing. In fact, many women who have a mistimed pregnancy may ultimately come to view their pregnancy positively,²¹ despite its being unintended. The desire for a baby, which Stanford and colleagues⁵² describe as stemming from personal, partner and community values about childbearing, is therefore important to consider.

The finding that women who were happy to be pregnant were more likely than unhappy women to report exposure to environmental tobacco smoke in the past week was contrary to our expectations and warrants further study. Happier women may be more likely to have partners, or likely to have a larger social circle, and therefore potentially have a greater chance of encountering smokers. Or women who are happy may be more

TABLE 7. Unadjusted and adjusted odds ratios (and 95% confidence intervals) from logistic regression analysis assessing the association between various characteristics and feeling happy about being pregnant

Characteristic	Unadjusted (N=989)	Adjusted (N=989)
Mean age	na	0.99 (0.95–1.03)
Education**		
≥some college (ref)	na	1.00
H.S. graduate/GED	na	1.95 (1.22–3.10)
<H.S. degree	na	2.51 (1.47–4.26)
Employment status		
Not working, did not work before pregnancy (ref)	na	1.00
Working full-time or part-time	na	0.99 (0.62–1.58)
Not working, worked before pregnancy	na	1.01 (0.65–1.59)
No. of household members*		
≥5 (ref)	1.00	1.00
3–4	1.36	1.42 (0.94–2.15)
1–2	2.42	2.13 (1.22–3.73)
Cognitive/behavioral coping***	1.03	1.03 (1.01–1.05)
Gestational age at baseline survey**	0.96	0.97 (0.94–0.99)
No. of living children***		
0 (ref)	1.00	1.00
1	0.37	0.35 (0.20–0.60)
2–3	0.29	0.28 (0.15–0.51)
≥4	0.22	0.33 (0.14–0.75)
Has child aged <2***		
No (ref)	1.00	1.00
Yes	0.31	0.41 (0.26–0.63)
Used family planning at time of conception*		
Yes (ref)	1.00	1.00
No	1.82	1.58 (1.08–2.34)
Marital/relationship status		
Married/cohabiting (ref)	1.00	1.00
Single	0.48	0.58 (0.35–0.96)
Separated/divorced	0.39	0.68 (0.28–1.62)
No. of sexual partners in past year**		
1 (ref)	1.00	1.00
2	0.68	0.55 (0.36–0.85)
≥3	0.47	0.48 (0.28–0.83)
Partner status		
Partner is father of baby (ref)	1.00	1.00
Partner is not father of baby	0.42	0.68 (0.30–1.57)
No partner	0.41	0.61 (0.39–0.95)
Father desires pregnancy**		
Yes (ref)	1.00	1.00
No	0.26	0.41 (0.25–0.70)
Don't know/not sure	0.45	0.61 (0.35–1.06)
Frequency of sexual coercion by partner in past year	0.98	0.99 (0.97–1.01)
Satisfaction with emotional support from anyone other than partner	1.01	1.00 (0.99–1.01)

 $\chi^2=165.95_{24}^{***}$
 $R^2=0.155$, Max R^2 square=0.246

*p<.05. **p<.01. ***p<.001. Notes: Based on multivariate models controlling for maternal age, education and employment status, and using a dichotomous happiness variable (unhappy vs. happy and moderately happy combined). Characteristics with no reference group are continuous. na=not applicable. ref=reference group.

be the risk factor over which women have the least control.

After establishing associations between happiness and risk, we sought to identify the demographic, intrapersonal, reproductive and interpersonal correlates of a woman's feelings about pregnancy. A distinct pattern of personal and social factors was associated with happiness in this ethnically and socioeconomically homogeneous sample. Multivariate analyses found that women who were happy or moderately happy to be pregnant were less educated, lived in smaller households and had a greater range of coping strategies than unhappy women. Happy women were also less likely to have been using birth control at conception, which is consistent with either their having planned the pregnancy or their not having intended to avoid pregnancy. In contrast, the odds of being happy were reduced among women who had other children, who had a child younger than two and who were further along in their pregnancies, which suggests that happiness was strongly related to parity and prenatal care initiation. The odds were also reduced among women who were single, who had no current partner, who perceived that the baby's father did not desire the pregnancy and who had had more than one sexual partner in the past year—highlighting the importance of intimate partner relationships and the father's desire to have this child in influencing a woman's feelings about her pregnancy.

These findings are similar to those of previous studies that have found associations between pregnancy intentions and women's reproductive history and contraceptive practices,^{37,53,54} as well as the quality and stability of partner relationships.^{52,54–57} However, several differences merit further study. For example, demographic correlates of unintended or unwanted pregnancy in other studies have included younger age,^{37,56} receipt of Medicaid,^{37,54,58} less education^{37,58} and being black.³⁷ Interpersonal correlates have included increased risk for intimate partner violence before or during pregnancy^{16,59,60} and less emotional support from others.⁵⁴ In representative samples, black, poor and less educated women have been shown to have elevated risks of infant morbidity and mortality, unintended pregnancy and some maternal risk behaviors;^{37,61–63} one study demonstrated that they are less likely than others to receive advice from their prenatal care providers about those risks.⁶⁴

Several factors in our study were not independently associated with happiness (e.g., maternal age, receipt of Medicaid, experience of intimate partner violence, emotional support from others) or their associations were the opposite of those found in the pregnancy intention literature (e.g., women who were happy had lower levels of education). Reasons for these differences and similarities are important to consider in future research; the most obvious potential explanation is that this study was conducted among a homogeneous sample of low-income black women who were at elevated risk.

sensitized to or aware of environmental risks and how they may adversely affect pregnancy, and thus these women report greater exposure. Alternatively, this may

Limitations

Several study limitations must be considered. First, these analyses were based on cross-sectional data, and hence our findings reflect associations but do not indicate causality. Second, the analyses were based on recall—pregnancy intendedness questions were phrased in relation to plans at the time of conception, and the happiness question focused on a woman's feelings when she found out she was pregnant. Third, women might have answered differently had they been surveyed earlier or later in their pregnancy; within-subject variation in pregnancy perceptions,^{65,66} and in risk factors such as depression,⁶⁷ smoking⁶⁸ and alcohol use,⁶⁹ has been found across trimesters. And while we controlled for gestational age in our analyses of risk, assessments for some women may have occurred before or after they initiated changes to protect their baby from potential harm. Fourth, we included only a subset of possible correlates of happiness that might influence a woman's feelings about her pregnancy, or potentially explain differences between our findings and previous ones. Finally, we used a nonrepresentative sample of low-income black women who screened into a multifactor behavioral intervention trial because they were at increased risk, and so our findings cannot be generalized beyond a similar population.

Conclusions

Our findings suggest that several simple screening questions—asking pregnant women to rate how happy they are to be pregnant, asking about their perceptions of the fathers' desire for the pregnancy, and asking about their current and recent partner relationships—could help prenatal care providers identify women who are at increased risk for adverse infant health outcomes. Women at risk could easily be referred for additional support or in-depth screening to identify more specific needs. The American College of Obstetricians and Gynecologists' Committee on Health Care for Underserved Women recommends perinatal screening and intervention for psychosocial risk factors that may influence a woman's attentiveness to personal health matters, prenatal care use and ultimately her child's health.⁷⁰ Psychosocial screening is recommended and should be documented in medical records for all women, at least once each trimester. Screening is recommended for depression, stress, social support, intimate partner violence, barriers to care (e.g., transportation, child care, insurance), communication barriers, unstable housing, neighborhood safety, risk behaviors (e.g., tobacco and other substance use, nutrition), pregnancy intentions and parenting concerns, but not for a woman's—or her perceptions of her partner's—feelings about her pregnancy, nor for her current or recent partner relationships.

Prenatal screening that assesses a woman's feelings about her pregnancy, the quality of partner relationships and particularly her perceptions of the father's desire for

the pregnancy could significantly strengthen prenatal care services for women who have potentially heightened risk during pregnancy. Screening for these factors could help improve providers' sensitivity, lead to tailored advice on strategies to reduce behavioral and psychosocial risks, focus provider attention on the emotional and social context of women's pregnancies, and help women get needed support to improve pregnancy and infant health outcomes. A psychosocial screening tool being used in Canada that includes similar items has received favorable response from providers and clients, and has proven successful in facilitating client disclosure and provider identification of psychosocial risk factors during pregnancy.^{71,72} Finding ways to ensure that psychosocial screening for these factors, in addition to those recommended by the American College of Obstetricians and Gynecologists, becomes a standard practice in prenatal care is a critical step in improving both maternal and infant health.

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