
Validating a Model Developed to Predict Prenatal Care Utilization

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Background. Many pregnant women in the United States do not obtain adequate prenatal care. While it is essential to provide women with access to prenatal care, access alone is insufficient to guarantee that all women will receive adequate prenatal care. Previous research has identified a number of personal and cultural barriers to prenatal care. We have integrated these barriers into an explanatory model called the Social Pregnancy Interaction Model, the centerpiece of which is the concept of a "social pregnancy identity," as distinct from the physiologic reality of pregnancy. The purpose of this study was to validate the dimensions of this model.

Methods. Based on previous qualitative work, a questionnaire was developed. It was administered by interview to a convenience sample of 287 pregnant women receiving prenatal care in 11 practices in central Missouri. Item

analysis and factor analysis were used to define scales and validate the relationships predicted by the model.

Results. With some modifications, the following dimensions of the model were confirmed as distinct and significant: awareness of pregnancy, acceptance of pregnancy, self-care, communication with family, communication with partner, social attitudes toward prenatal care, and attitudes toward the health care provider.

Conclusions. The model has potential for predicting the utilization of prenatal care. The results also suggest that a woman's relationship with her prenatal care provider is important to obtaining adequate prenatal care.

Key words. Prenatal care; utilization; model; social behavior; health behavior; physician-patient relations.
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Although prenatal care appears to improve perinatal outcome,¹⁻⁶ many women do not seek care. Twenty-six percent of all expectant mothers in the United States during 1990 failed to receive care during the first trimester.⁷ This figure has remained virtually unchanged since 1978, and falls far short of the *Healthy People 2000* goal of 90% receiving care in the first trimester.⁸ Only 73% of white expectant mothers and 52% of African-American expectant mothers received adequate prenatal care in 1991.⁹

Efforts to increase adequate prenatal care rates have lowered structural barriers, such as affordability, transportation, child care, and availability of providers. In particular, the Medicaid program has been expanded to provide health insurance access for pregnant women and incentives for providers to care for these women.^{10,11} Even when structural barriers are greatly reduced, however, a large group of pregnant women still do not make optimum use of the health care system. In 1992, for example, 36.7% of Missouri women on Medicaid received inadequate prenatal care compared with 9.6% of women not on Medicaid, and 12.6% of white expectant mothers received inadequate prenatal care compared with 35.6% of African-American expectant mothers.¹² Several other studies have also shown that recipients of Medicaid do not obtain prenatal care as early or as often as women with private insurance.¹³⁻¹⁷ It appears that a set of cultural and personal hindrances remain. Consistent with this, a review by

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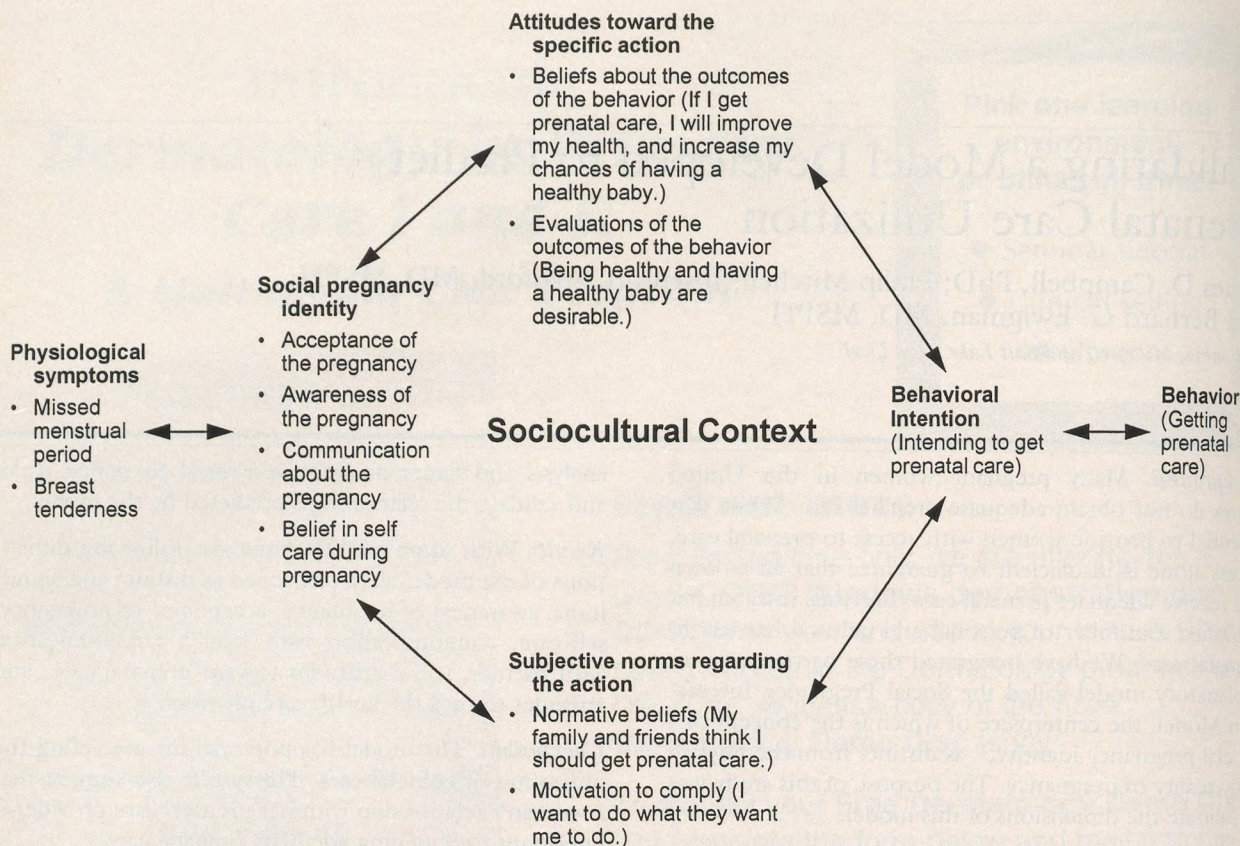


Figure. The Social Pregnancy Interaction Model incorporates the concept of social pregnancy²⁰ into the Theory of Reasoned Action¹⁹ as applied to the intention to seek prenatal care.

the Institute of Medicine¹³ found that women’s attitudes and beliefs as well as personal and cultural experiences significantly influence decisions about seeking prenatal care during the first trimester. This review strongly recommended that further research be conducted to explore such nonstructural barriers to prenatal care.

Based on our previous work, which illustrated the significance of nonstructural barriers in seeking prenatal care,¹⁸ we have developed as an explanatory model the Social Pregnancy Interaction Model to help explain cultural and personal influences on seeking care. This model integrates Ajzen and Fishbein’s Theory of Reasoned Action^{19,20} with the concept of social pregnancy.²¹ The Theory of Reasoned Action can be considered an expansion of the Health Belief Model.²² In addition to describing an individual’s beliefs about health threats and behaviors, the Health Belief Model includes the components of subjective social norms about those health behaviors, thus describing a more complete sociocultural context for the behaviors. The concept of social pregnancy, which was originally described by Miller,²¹ refers to the social process of acknowledging a pregnancy and acquiring a “preg-

nancy identity.” According to this concept, a woman acquires and develops a social pregnancy identity by recognizing and interpreting the physiologic events of pregnancy: suspecting that she is pregnant, discussing the pregnancy with significant others, having the diagnosis confirmed, accepting the pregnancy, and altering her health behaviors to accommodate the pregnancy. Ordinarily, a woman’s social pregnancy identity will have developed substantially before the initiation of prenatal care.

As shown in the Figure, a woman’s social identity as being pregnant reinforces and is reinforced by attitudes and subjective norms regarding prenatal care. Reciprocally, these attitudes and norms are activated and shaped by the evolving social pregnancy identity. This process, however, is not always a smooth transition.²³ Within a given social and cultural context, there may be differing interpretations of whether the woman is pregnant, whether pregnancy is desirable, or whether prenatal care is necessary.

Physiologically, a woman is considered to be either pregnant or not pregnant, but the physical manifestations of the pregnancy develop and progress with time (eg, the

Table 1. Dimensions of the Social Pregnancy Interaction Model

Concept	Dimensions
Social Pregnancy	Awareness Acceptance/valuation Communication about the pregnancy Self-care
Attitudes Toward Prenatal Care	Social context Intention Significance

enlargement of the uterus, quickening). If the development of the social pregnancy identity is normal and healthy, the physiological development of pregnancy will correlate with appropriate social meanings ascribed to the physiological events. Within a social context that is supportive of early prenatal care, this will result in a strong behavioral intention and, in the absence of structural barriers, the early initiation of prenatal care. However, if the social context is ambivalent or negative regarding the value of prenatal care, prenatal care may not be sought until much later in the pregnancy.²⁴⁻²⁷

The purpose of this study was to test an instrument designed to measure the dimensions of the Social Pregnancy Interaction Model. We believe that this model offers a more expanded view of the factors involved in prenatal care utilization than do models that do not incorporate the dimension of social pregnancy identity,²⁸ and that the concepts developed in this model will increase our understanding of why many women with access to prenatal care fail to receive adequate care.

Methods

Based on the findings of our earlier qualitative study suggesting that cognitive variables, such as the level of desire for the pregnancy, for early confirmation of the pregnancy, and for the experience of early pregnancy symptoms, may account for much of the delay in entry to prenatal care, we developed measures of the concept of social pregnancy (Table 1).¹⁸ A structured questionnaire was designed that contained subscales to measure the following social pregnancy dimensions: (1) awareness of being pregnant or the possibility of being pregnant, including physical symptoms and the interpretation of those symptoms; (2) acceptance of being pregnant or the possibility of being pregnant; (3) the amount of communication with significant others about the pregnancy identity and behaviors; and (4) self-care behaviors of pregnancy, eg, changing diet, exercise, smoking, and alcohol intake, on the basis of being pregnant.²⁹

Since attitudes toward prenatal care are considered an important component of our model, we also developed subscales to include the following dimensions pertaining to the social context of prenatal care (Table 1): (1) social attitudes, cultural beliefs, and subjective norms about prenatal care; (2) personal and social beliefs about the significance of prenatal care; and (3) behavioral intentions to seek prenatal care.

Each scale on the questionnaire consisted of several statement items with a 5-point Likert-type response (ie, strongly agree, agree, undecided, disagree, strongly disagree). The questionnaire also contained the following independent variables: age, race, town size, current gestational age, gestational age at first prenatal visit, number of adults and children in household, number of times pregnant, number of births, number of prenatal visits during this pregnancy, planning for pregnancy, method of payment for prenatal care, level of education, and household income. At the end of the questionnaire were two open-ended questions designed to determine why some women obtain early prenatal care and why others delay doing so were placed at the end of the questionnaire.

Utilizing a convenience sample, women at various gestational ages of pregnancy were approached (ie, not referred) in clinic waiting rooms by either clinic staff or research assistants in six public and five private practice sites located in mid-Missouri. These practice sites represented both family physicians and obstetricians. A standardized statement was used to obtain verbal consent from each subject and to assure participants of anonymity and confidentiality. After consent was obtained, each subject was interviewed by a research assistant using the structured questionnaire. On-site interviewing was selected as a method in order to obtain additional clarification of statement items and to gauge how well respondents understood each item.

Analyses were completed using SPSS/PC computer software (SPSS, Inc, Chicago, Ill, 1992) and SAS software (SAS Institute, Inc, Cary, NC, 1987). The procedure for assessing the validity and reliability of the scales was, first, to perform an item analysis on each scale. After eliminating the items that had a low inter-item correlation, we next performed a factor analysis on all the remaining items for social pregnancy and attitudes toward prenatal care. An alpha factor analysis was used because it seeks to define factors that have maximum generalizability, as measured by Cronbach's alpha. After promax (oblique) rotation, individual factors were identified. The factor loadings for each item were then used as weights, and individual responses were subsequently standardized. Total scores for social pregnancy identity and attitudes toward prenatal care were calculated by adding their respective subscales.

Additional analyses included stepwise linear regression and *t* tests for independent samples.

Results

Our sample consisted of 287 pregnant women currently receiving prenatal care. Their ages ranged from 15 to 40 with a mean of 24.8 years. Ninety-four percent of the women in our sample were white, 4% were African-American, and 1% were Asian. Sixty-three percent lived in towns with populations of less than 50,000. The mean current gestational age was 25 weeks with a range of 4 to 40 weeks. The average number of adults in each household was 2.2 persons. Forty-one percent of the women said their pregnancy was planned. The sample was evenly split between women with a high school education or less and those who had more than a high school education. Fifty percent had an annual household income below \$20,000. Fifty-seven percent were on Medicaid, 34% had private insurance, and 7% were paying for care themselves, with 2% selecting the other category.

As shown in Table 2, the results of a factor analysis on the social pregnancy scales confirm that scale items load together as theoretically predicted. The "communication with significant others" scale, however, separated into two distinct subscales: "communication with family members" and "communication with husband/boyfriend/partner." Reliability estimates using coefficient alpha exceeded .78 for each of the five scales: acceptance of the pregnancy, awareness of the pregnancy, self-care behaviors of pregnancy, communication with family members about the pregnancy, and communication with husband/boyfriend/partner about the pregnancy. These five scales were positively related to a woman's current week of gestation ($r=.30$, $P<.001$), which suggested that a woman's social pregnancy identity becomes stronger over the course of the pregnancy.

With regard to the scales developed to measure the social context of prenatal care, a factor analysis reached a simple structure with two distinct dimensions (Table 3): (1) social attitudes toward prenatal care, which included intention to seek prenatal care, the social context of prenatal care, and the significance of prenatal care; and (2) attitudes toward the health care provider. Reliability estimates using coefficient alpha exceeded .88 for these two scales. It is interesting to note that the intention scale did not separate as a distinct scale, but was integrated with the scales on social context of prenatal care and significance of prenatal care. Evidently, the intention to seek prenatal care cannot be easily separated from the sociocultural context of which it is a part.

The interfactor correlations for the social pregnancy

Table 2. Social Pregnancy Scales and Items with Item Factor Loadings

Factor Items	Factor Loading
Factor 1—Acceptance	.83*
I was happy when I found out I was pregnant.	.78
I wish I wasn't pregnant.	.67
I couldn't wait to tell my friends that I was pregnant.	.61
I look forward to being a parent.	.54
Having a baby is what I always wanted.	.53
Factor 2—Self-care	.83*
What I do during my pregnancy can make a difference in the health of the baby.	.68
It's important to eat healthy food during pregnancy.	.64
It's important to gain some weight during pregnancy.	.58
Since being pregnant, I don't pay attention to what I drink.	.56
This pregnancy is an important time in my life.	.54
Factor 3—Communication with Family	.78*
Since being pregnant, I like the way my family treats me.	.68
I was reluctant to tell my family I was pregnant.	.62
My family was not pleased to hear that I was pregnant.	.57
My friends don't think I should be a parent.	.55
My family doesn't help me during my pregnancy.	.53
My family says I will be a good parent.	.51
Factor 4—Communication with Partner	.82*
My husband/boyfriend/partner helps me during my pregnancy.	.77
Since being pregnant, I like the way my husband/boyfriend/partner treats me.	.70
My husband/boyfriend/partner was pleased to hear that I was pregnant.	.62
My husband/boyfriend/partner says I will be a good parent.	.56
When the baby is born I don't expect my husband/boyfriend/partner to help me.	.54
Factor 5—Awareness	.80*
My friends often tell me I look pregnant.	.79
People don't usually notice that I am pregnant.	.69
My husband/boyfriend/partner tells me that I don't look pregnant.	.64
I'm sure that I have felt the baby moving.	.60
I have started wearing larger clothes because of this pregnancy.	.59
So far, being pregnant hasn't changed my body much.	.50

*Alpha reliability coefficient.

NOTE: Each item had a factor loading equal to or greater than .50 on a single factor.

scales are shown in Table 4. Except for the awareness scale, the scales appear to correlate. In addition, the "attitudes toward prenatal care" scale and the "attitudes toward provider" scale correlate ($r=.60$). Although these factors are correlated, a varimax orthogonal rotation identified similar factors, suggesting that these factors represent distinct concepts.

In other analyses, a positive relationship was found between a woman's scores on the social pregnancy scales and her attitudes toward prenatal care. In a regression model, social pregnancy identity, ie, the multiple factors

Table 3. Scales to Measure Women's Attitudes Toward Prenatal Care

Factor Items	Factor Loading
Factor 1—Attitudes Toward Prenatal Care	.93*
I think I should get prenatal care.	.79
I believe everyone should get prenatal care.	.71
It's important to learn as much as you can about your pregnancy from your health care provider.	.68
It is important to get prenatal care as soon as possible.	.66
I don't plan to get prenatal care unless I have problems with this pregnancy.	.65
I intend to get prenatal care.	.64
My family tells me that getting prenatal care is a waste of time.	.62
I know women who have received prenatal care.	.59
My friends tell me that getting prenatal care is a waste of time.	.56
I listen to what my health care provider tells me about this pregnancy.	.56
It's very important to keep all of your prenatal appointments with the health care provider.	.55
I think it's important to find out as soon as possible if you're pregnant.	.53
Factor 2—Attitudes Toward the Provider	.88*
I have received good advice about pregnancy from my health care provider.	.73
My health care provider seems interested in how I'm doing during this pregnancy.	.72
I am not satisfied with the prenatal care I have received.	.68
I like the health care provider who gives me prenatal care.	.68
My health care provider probably wouldn't notice if I stopped coming in for my prenatal visits.	.52

*Alpha reliability coefficient.

NOTE: Each item had a factor loading equal to or greater than .50 on a single factor.

of social pregnancy noted above as entered into a regression model, accounted for 71% of the variance in women's attitudes toward prenatal care. In other words, a stronger social pregnancy identity was associated with a stronger reported desire to seek prenatal care and a higher level of recognition of the importance of prenatal care. There was also a strong positive relationship between social pregnancy identity and attitudes toward the health care provider. Fifty-one percent of the variance in women's attitudes toward their health care providers was accounted for by the social pregnancy identity. Women with a stronger social pregnancy identity were more likely to have

higher positive attitudes toward their provider than were women with a weaker social pregnancy identity.

Women who reported having planned their pregnancy were more likely to have a stronger social pregnancy identity and have favorable attitudes toward prenatal care and their health care provider than were women who reported that they did not plan their pregnancy. Women who were on Medicaid had a weaker social pregnancy identity and less-positive attitudes toward their prenatal care provider and prenatal care than did women who had insurance. Similarly, women with a high school education or less had a weaker social pregnancy identity and less-positive attitudes toward their prenatal care than did women with more than a high school education.

With respect to age, women who were less than 20 years of age had a lower social pregnancy identity and less-positive attitudes toward their health care provider than did women 20 years of age or older. Differences in social attitudes toward prenatal care, however, were not significant when analyzed by reported planning of pregnancy, insurance status, education, or age.

The number of times a woman had been pregnant, the number of previous births she had had, the number of adults and children in the household, and geographical location were not related to the social pregnancy identity or attitudes toward prenatal care.

Content analysis of opinions about why women get prenatal care or delay getting prenatal care is listed in Table 5. The reason given by the majority of participants (65%) for obtaining care was the desire for a healthy baby. Other leading reasons were to maintain their own health, monitor the baby's development, and to detect and prevent birth defects. The most frequent opinion as to why some women delay getting prenatal care was financial (58%) followed by a belief that it is unnecessary, denial of the pregnancy, not caring about themselves or their baby, and not wanting to be pregnant.

Discussion

The results of this study are limited by several factors stemming from the cross-sectional design, the homoge-

Table 4. Social Pregnancy Scale Interfactor Correlations

Social Pregnancy Scales	Acceptance	Self-care	Communication with Family	Communication with Partner	Awareness
Acceptance	1.00000				
Self-care	0.48567	1.00000			
Communication with family	0.39830	0.43506	1.00000		
Communication with partner	0.35285	0.49386	0.38970	1.00000	
Awareness	0.21706	0.17718	0.25695	0.11256	1.00000

Table 5. Reasons Women Sought or Delayed Prenatal Care

Reason*	% of Cases (N=287)
Sought prenatal care	
They want a healthy baby	64.5
To maintain their own health	29.3
To monitor baby's development	23.3
To detect and prevent birth defects	17.8
To learn about pregnancy	9.8
Delayed prenatal care	
They can't afford it	57.5
They don't think they need it	17.1
Denial of pregnancy	13.9
They don't care about self or baby	12.9
They don't want to be pregnant	10.8

*Women were allowed to list multiple reasons.

neity of the sample, and convenience sampling. Because we studied women receiving prenatal care, we could not assess the dimensions of the Social Pregnancy Interaction Model among women who do not seek prenatal care. Further, there were few women in our sample who had presented late for prenatal care. Similarly, this study cannot address the applicability of this model to African Americans, who were minimally represented in the sample, or to other minorities, who were effectively absent. Finally, we did not study women from inner cities. Further studies of women from these populations are needed to assess the applicability of this model in those populations.

Despite these limitations, the results of this study provide important initial confirmation for the dimensions of the Social Pregnancy Interaction Model. The communication about the pregnancy subscale was split into two scales: communication with husband/boyfriend/partner and communication with family members. There appears to be a difference in the degree of comfort a woman has in communicating with her husband/boyfriend/partner and other family members. The results of the factor analysis showed, however, some correlation between these constructs.

The findings suggest that the social context of prenatal care, the intention to seek prenatal care, and the patient's beliefs about the significance of prenatal care are inseparable. Based on this knowledge, we have modified the Social Pregnancy Interaction Model to include the intention to seek prenatal care as part of the sociocultural context rather than as a unique event in the decision to begin prenatal care. This analysis also identified and revealed the importance of an additional scale that measures a woman's attitudes toward her health care provider. This result is consistent with studies that have found that a woman's attitude toward her health care provider is a predictor of the timing of initiation of prenatal care.^{16,30-32} This added dimension may increase the po-

tential of the model to predict the timing of entry into prenatal care. The potential implications of this dimension for compliance with prenatal care are explored later in this discussion.

In this sample, a stronger social pregnancy identity correlated with increased gestational age. This is consistent with the model's prediction that social pregnancy identity normally increases over the duration of pregnancy. Prospective studies that measure a woman's social pregnancy identity from the time of initiation of prenatal care through delivery would confirm this aspect of the model. Moreover, since the data show a stronger social pregnancy identity toward the latter part of the pregnancy, a prospective study enrolling women at the first prenatal visit would eliminate any potential recall bias likely to occur if the social pregnancy identity was measured only at later prenatal visits or during the postpartum period.

Age, level of education, and method of payment for prenatal care were all associated with a stronger social pregnancy identity and positive attitudes toward prenatal care and the health care provider. A stronger social pregnancy identity also corresponded with having planned the pregnancy, confirming Miller's research,²¹ which showed that planning affected the development of the social pregnancy identity. All of these factors have been associated with the timing of entry into prenatal care,^{16,33-35} providing further support for the potential of the Social Pregnancy Interaction Model to predict the timing of entry into prenatal care.

The content analysis of women's reported opinions supports the findings of the factor analysis in several ways and also adds further insight. The reasons cited for getting prenatal care all seem to relate to perceived positive benefits of prenatal care to the health of both the mother and baby during and after pregnancy. This supports the important role for attitude toward prenatal care in the model. While the most common reason cited for not getting prenatal care was related to finances, denial of the pregnancy and not wanting to be pregnant were also mentioned, supporting the importance of awareness and acceptance of pregnancy. Two of the cases in our study clearly identify denial as an important barrier to seeking prenatal care.

Case 1. An 18-year-old postponed seeking prenatal care until the second trimester. She waited until the day after graduating from high school to tell her parents she was pregnant and to make an appointment for prenatal care. She said some women delay getting prenatal care because, "They are procrastinators like me; getting prenatal care is like admitting to yourself you are pregnant even if you really knew it."

Case 2. A 31-year-old mother of three presented for prenatal care in the 16th week of gestation. In her opinion, some women delay seeking prenatal care not only because of denial but also because they really don't want to be pregnant. She said, "They put off the inevitable, not wanting to face that they are pregnant; they hope it will go away."

Since acceptance is a dimension of the social pregnancy identity, it is not surprising that women in denial of their pregnancy would most likely have poor communication with their family members and/or husband/boyfriend/partner about the pregnancy. The Social Pregnancy Interaction Model predicts that a woman in denial of her pregnancy would have a low social pregnancy identity and be less likely to initiate prenatal care early in the pregnancy. Consistent with this, denial of pregnancy has been found to be a predictor of late entry into prenatal care.^{18,35-38}

Further research on the Social Pregnancy Interaction Model should investigate its applicability to more diverse populations. Ideally, studies should be conducted prospectively, enrolling women at the time they come in for pregnancy testing and following them until they give birth. As noted in the discussion above and based on the authors' experience with the Social Pregnancy Interaction Model, many of the factors that have been shown to predict the timing of initiating care are directly or indirectly associated with the model in its current form. Other factors that may impact prenatal care utilization, such as poverty,¹⁶ violence, substance abuse, depression, alienation from mainstream culture, and use of contraception³³ or family planning services,³⁹ should be explored in studies designed to show the power of this model to predict the initiation and subsequent compliance with prenatal care. It will be interesting to see if such factors will be found to affect the social pregnancy identity or to operate independently of it.

If confirmed in future studies, these results would have important implications for practice for clinicians providing prenatal care. A woman's attitude toward her health care provider is a distinct and powerful factor that is strongly correlated with social pregnancy identity. This suggests that when a woman is satisfied with her prenatal care provider, she will have a stronger social pregnancy identity, be more likely to adhere to follow-up prenatal visits, and perhaps be more likely to make positive lifestyle changes, eg, stop smoking, that can improve the outcome of pregnancy. Although we did not measure it in this study, we speculate that continuity of prenatal care with a provider the woman trusts may enhance this process.⁴⁰⁻⁴³

Perhaps more importantly, the Social Pregnancy Interaction Model is likely to have important implications

for public policy regarding prenatal care. We believe that optimizing the use of prenatal care will require innovative approaches for assessing and strengthening the processes by which women acquire and develop a social pregnancy identity, as well as strengthening positive social and cultural norms regarding prenatal care within diverse cultures and communities. This will require the integration of prenatal care with other aspects of women's health, from both clinical and social perspectives.⁴⁴

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