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Is pregnancy a teachable moment for smoking cessation among US Latino expectant fathers? A pilot study

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Abstract

Objective—Pregnancy may be a time when US Latino expectant fathers consider quitting smoking. A ‘teachable moment’ is theorized to increase motivation to change a behavior through increased risk perceptions, emotional responses, and changes in self-image.

Design—We recruited 30 Spanish-speaking expectant fathers through their pregnant partners. We assessed expectant fathers’ diet, exercise, and smoking and teachable moment constructs (risk perceptions, emotional responses, and self-image). We also tested correlations between teachable moment constructs and motivation to change behaviors.

Results—Latino expectant fathers had high-risk perceptions that their smoking harmed the pregnancy ($M = 4.4$, $SD = 0.5$ on five-point scale) and strong emotional responses about their smoking during pregnancy ($M = 3.9$, $SD = 1.1$). They also felt it was their role to make the pregnancy healthy ($M = 4.4$, $SD = 0.8$). They felt less strongly that their diet and exercise affected the pregnancy. The teachable moment constructs for smoking were strongly correlated with motivation to quit smoking; the same was not true for diet and exercise.

Conclusions—Latino expectant fathers seem aware that their smoking could harm the pregnancy but seem less concerned about the effect of their diet and exercise on the pregnancy. Pregnancy may be a time to help Latino expectant fathers quit smoking.

Keywords

smoking; pregnancy; fathers; Latino; teachable moment

Although pregnancy is a time when both members of a couple might consider making behavior changes for the health of the unborn child, research in this area has historically focused on maternal behavior change during pregnancy. Previous research suggests that

many pregnant women stop drinking alcohol completely, and as many as half who smoke subsequently decide to quit (Ebrahim *et al.* 2000, Orleans *et al.* 2000, Ockene *et al.* 2002). Also, some improve their nutrition when pregnant (Olson 2005). Pregnant women tend to reduce their physical activity or stay inactive during pregnancy (Petersen *et al.* 2005, Rousham *et al.* 2006), although exercising clearly has benefits for women's physical and mental health (Kramer and McDonald 2006, Poudevigne and O'Connor 2006). Although several studies indicate that partner support helps women make changes during pregnancy, such as quitting smoking (McBride *et al.* 1998, Pollak *et al.* 2001, Park *et al.* 2004), far less information is known about partners' own behavior changes during pregnancy (Gage *et al.* 2007). A recent review of partner support and partner smoking during pregnancy indicates that expectant and new fathers are willing to make changes (Gage *et al.* 2007). Furthermore, a few studies have reported that men quit smoking spontaneously during their partners' pregnancies (Pollak and Mullen 1997, Everett *et al.* 2005); however, few have explored how expectant fathers view their smoking and other health habits during pregnancy. One study indicates that expectant fathers continue to have unhealthy habits during pregnancy (Everett *et al.* 2006).

A recent qualitative study indicates that men feel differently about their health habits during pregnancy because they feel they need to think about the family rather than just about themselves (Bottorff *et al.* 2006). However, men's ambivalence about changing their own behaviors might occur partly because their health habits, with the exception of smoking, may only indirectly affect the health of the fetus. For instance, men can continue to drink alcohol, eat unhealthily, and be sedentary and have no direct impact on the growth or development of the fetus. However, expectant fathers' smoking may harm the fetus as second-hand smoke crosses the placenta and hinders neonatal development (Mainous and Hueston 1994, Dejin-Karlsson *et al.* 1996, Misra and Nguyen 1999, Windham *et al.* 2000, John and Hanke 2002, Hegaard *et al.* 2006). Harm to the fetus even occurs from people who smoke solely outside the home (Al-Delaimy *et al.* 2001, Matt *et al.* 2004) because smokers still bring harmful chemicals into the house on their clothes and hair. However, many expectant fathers are unaware that their smoking harms the fetus. Focus groups conducted with expectant fathers found they believed women filtered cigarette smoke and protected the baby (Wakefield *et al.* 1998).

To prevent negative effects of partner smoking on the fetus, two randomized trials have targeted partner smoking during pregnancy. Loke and Lam (2005) found that when obstetricians gave women advice that their partners should quit smoking, more partners had quit smoking by the last month of pregnancy (8.4% vs. 4.8%). Stanton and colleagues intervened directly with partners and found that partners in the intervention arm who received an educational video, a call from a physician, and free nicotine replacement therapy were more likely to report cessation at the end of pregnancy than partners in the standard care arm (16.5% vs. 9.3%) (Stanton *et al.* 2004).

Although these studies indicate that interventions may be effective in promoting partner smoking cessation during pregnancy, the theoretical underpinnings of change in these programs are unknown. McBride *et al.* (2003) have proposed a theoretical framework that describes partner changes during pregnancy known as the 'teachable moment' model, which is based on a previously undefined but long-used concept. In their model, they define the teachable moment as a naturally occurring event or life transition that contributes to: (1) increased perceptions of one's vulnerability to health risks; (2) emotional responses; and (3) changes in one's self-image. These three changes together then lead to increases in motivation to change (McBride *et al.* 2003). Figure 1 depicts this model.

Expectant fatherhood might be a teachable moment for men to quit smoking and change other health behaviors. First, changes in perceived risks to self and family might increase motivation to quit smoking or change other health-related behaviors. Expectant fathers, recognizing that the new baby will increase their responsibility as family providers, might view the potential effects smoking has on their own health with greater concern than they had in the past. Prior to experiencing this teachable moment, expectant fathers may not be aware of the potential for their smoking to harm others. Raising awareness of this risk might increase their motivation to quit.

Second, expectant fathers might experience a variety of emotions that could increase their motivation to quit smoking or alter other health behaviors. Men who have never thought their smoking could harm anyone might feel guilty or sad to learn that their smoking is detrimental to others or their ability to care for their loved ones. Alternatively, expectant fathers may have positive emotional responses; for example, expectant fathers may feel proud about quitting or improving their diet for the sake of the family. Third, the pregnancy might redefine the expectant father's self-image as a good partner and potential good father. For instance, he might see himself as more of a caretaker for his pregnant partner than he had before.

Although the birth of a child is a life-changing event and likely to have some effect on new fathers, there is no guarantee that it will alter their view of their smoking and related health behaviors. These potential changes in risk-perceptions, emotional responses, and self-images during pregnancy and their associations with husbands' motivations to quit smoking have never been empirically evaluated. Identifying associations between the teachable moment constructs and motivation to quit smoking might help target potential points for cessation interventions. Thus research is needed to explore these changes in more depth.

Latino couples may be ideal for testing whether pregnancy is a teachable moment because so few Latinas smoke while Latinos have a high smoking rate. The current smoking rate among Latinos is 21%, which compares to 24% among White men (CDC 2007). Others have reported as high as 25% for Mexican American males (Wilkinson *et al.* 2005). Furthermore, Latino cultural values, such as *familismo*, or the valuing of family above others, may enhance the impact of pregnancy as a teachable moment and increase motivation to quit smoking and change other health behaviors. Among Latinos, the presence of children in the home can lead to higher rates of smoking cessation (Nevid and Javier 1997) and increase motivation to quit (Marin *et al.* 1994, Perez-Stable *et al.* 1998, Serrano and Woodruff 2003). Latinos endorse the following reasons for quitting smoking: being criticized by family, damaging children's health, family pressure, and being a good example for children (Perez-Stable *et al.* 1998). Furthermore, Latinas report that their partners' health behaviors influence their own health behaviors during pregnancy (Thornton *et al.* 2006).

Researchers have attempted to reach Latino smokers with various methods. These include community-wide interventions using radio, television, and posters displayed in community centers (Perez-Stable *et al.* 1991, McAlister *et al.* 1992, Marin *et al.* 1994), interventions via public school systems (Berman *et al.* 1995), and culturally tailored face-to-face interventions and pamphlets (Munoz *et al.* 1997, Nevid and Javier 1997, Woodruff *et al.* 2002). These previous interventions have notable limitations. First, most have recruited volunteers rather than using a broader population-based approach. There is a great need for interventions with broad recruitment approaches to reach this particularly vulnerable Latino population who have low use of health care, limited English language skills, few supports for cessation, and are unlikely to volunteer for cessation studies (Lawrence *et al.* 2003, Silberman *et al.* 2003). Second, similar to smoking cessation interventions that have been developed for non-Latinos, previous interventions for Latinos have had only short-term effects; no changes

remain statistically significant one-year post-intervention. Taken together, these findings suggest that capitalizing on the teachable moment of pregnancy for expectant fathers who are not self-selecting into a smoking cessation program might be a way to increase the potency and lasting effects of an intervention.

Although the teachable moment model is intuitively appealing, its constructs have not been tested empirically in either Latino or non-Latino populations. This pilot study had two purposes. The first purpose was to compare teachable moment constructs (risk perceptions, emotional response, and self-image) for three health behaviors during pregnancy (smoking, diet, and physical activity) among Latino expectant fathers. It was hypothesized that fathers would report greater increases in perceived risk, emotional responses, and changes in self-image for their smoking than for their diet and exercise because the risks of smoking to their pregnant partners and unborn children may be perceived as more direct and unambiguous. The second purpose was to test associations between teachable moment constructs (perceived risk, emotion, and self-image) and motivation to change health habits to provide some empirical evidence for the teachable moment model. If results indicate that pregnancy is a time when Latino expectant fathers want to quit smoking, then these findings might guide future interventions to target pregnancy as a time with heightened potential for behavior change and to emphasize the teachable moment constructs as mechanisms for this change.

Method

Recruitment

Thirty Latino expectant fathers participated in this study. They were recruited over a six-month period through contact with their pregnant spouses/partners in Spanish-speaking prenatal classes at an urban community health center in the Southeastern USA. Most patients who attend Spanish-speaking classes in this setting have recently immigrated, and most come from Mexico. Attendance at this class is a prerequisite for receiving prenatal care at the clinic, so it was possible to reach all pregnant Latinas who obtained care in that clinic. During the class, each woman visited tables providing information about health and prenatal services. One table was staffed by bilingual Latina recruiters who screened all women and asked each eligible woman (non-smoker, aged 18 years, living with a husband/partner who smoked daily) if she and her husband/partner would participate in a survey assessing health habits during pregnancy. The recruiter obtained contact information and made appointments to meet with each couple face-to-face at a convenient location (e.g., home or Latino community center). Women left the prenatal class with two consent forms and a small gift (a bib for the upcoming baby). At the meeting, the recruiter obtained written consent and asked each member of the couple to complete a set of surveys. All written materials and surveys were originally written in English at the fifth grade level, translated into Spanish, and back-translated into English to ensure linguistic and construct equivalence (Becerra and Shaw 1988). The recruiter remained available to explain any questions until both surveys were complete. This study was approved by the Durham County Health Department and the Institutional Review Board of Duke University Medical Center.

Sample characteristics

Recruiters screened 299 pregnant women who attended the Spanish-speaking prenatal classes. Of those, 255 (85%) were ineligible for the following reasons: younger than 18 years ($n = 17$), not partnered ($n = 73$), partnered, but partner does not smoke ($n = 146$), greater than 19 weeks gestation ($n = 16$), and smoking ($n = 3$). All 44 eligible women (15% of 299) agreed to ask their partners to participate; of those, 30 couples completed the surveys (68% of 44). The 14 partners who did not participate reported not having enough

time or interest in the study. There were no significant differences in age or weeks of gestation between women whose partner completed the survey and those who did not. This report is limited to data from the male partners' surveys.

Measures

Demographics—Men were asked their age, years of education, and employment status.

Health habits—Men were asked if they had smoked 100 cigarettes in their lifetime and whether they had smoked a cigarette in the past seven days. They were asked the average number of minutes they engaged in moderate exercise each day. They also were asked how often they ate servings of fruits and vegetables (1 = Never to 6 = Four or more a day).

Perceived risk—Because no measures existed for assessing the teachable moment constructs in this population or for this context, we developed measures for perceived risk, emotion, and self-image. When developing this measure, we met with community leaders who provided feedback on content and face validity. We edited the measures based on their feedback. Men were asked to assess their perceptions of the risk to their baby's health from smoking, diet, and physical activity. The smoking item read, 'I think smoking around my pregnant wife/partner is dangerous for her pregnancy' (1 = Strongly disagree to 5 = Strongly agree). The diet item read, 'I think eating food that is not healthy makes my wife/partner more likely to eat unhealthy food, which is not good for her pregnancy.' The exercise item read, 'I think by not exercising, my wife/partner is less likely to exercise, which is not good for her pregnancy.'

Emotion—Men were asked two questions about their emotions about smoking around their pregnant partner. The smoking item read, 'Since my wife/partner became pregnant, I feel bad if I smoke around her' (1 = Strongly disagree to 5 = Strongly agree). The other item read, 'Since my wife/partner became pregnant, I feel proud when I do not smoke around her.' For diet and exercise, men answered one question each about whether they felt bad about eating unhealthy food or failing to exercise around their wife/partner.

Self-image—Men were asked one question about how they viewed their role during the pregnancy. The item read, 'Since my wife/partner became pregnant, I see my role as doing whatever I can to help make her pregnancy as healthy as it can be' (1 = Strongly disagree to 5 = Strongly agree).

Motivation—Men were asked, in separate items, how much they wanted to quit smoking, improve eating habits, and improve exercise habits, during the pregnancy (1 = Strongly disagree to 5 = Strongly agree).

Analyses

Frequencies were calculated for demographic variables, teachable moment constructs (perceived risk, emotion, and self-image), and motivation to change each of the three behaviors (smoking, diet, and exercise). Means for the teachable moment constructs for smoking were compared with paired *t* tests to constructs for diet and those for exercise. The teachable moment model was tested by calculating Spearman correlations between teachable moment constructs for each health behavior and measures of motivation to change that behavior. Correlations and their 90% confidence intervals were estimated using Fisher's *z*-transformation.

Results

Sample characteristics

The sample consisted of 30 Latino expectant fathers. Their mean age was 29 years ($SD = 5.6$); the mean level of education level was 9 years ($SD = 3.6$). All men were employed and were smokers (eligibility criterion). Many reported unhealthy eating habits; only 30% of the men ate 1–3 servings of fruit per day, and even fewer (13%) ate 1–3 servings of vegetables per day. Median amount of daily exercise reported was 45 minutes ($IQR = 30, 120$).

Teachable moment constructs

Risk perceptions—Men felt strongly that their smoking was dangerous for the pregnancy ($M = 4.4, SD = 0.5$; see Table 1). Mean risk perceptions that smoking harmed the pregnancy were higher than mean risk perceptions about eating unhealthy food ($M = 3.3, SD = 1.3$) and not exercising ($M = 3.3, SD = 1.3$) ($p < 0.0001$ for each paired comparison).

Emotional response—Men expressed strong emotions about smoking in the presence of their pregnant partners, both in terms of feeling bad about smoking ($M = 3.9, SD = 1.1$) and feeling proud about not smoking ($M = 4.1, SD = 0.9$). Men felt worse about themselves when they smoked around their pregnant spouse than when they did not eat healthily ($M = 3.1, SD = 1.2$) or did not exercise ($M = 2.6, SD = 1.2$) ($p < 0.0001$ for each paired comparison).

Self-image—Men strongly endorsed that their role was doing whatever they can to make their partner's pregnancy healthy ($M = 4.4, SD = 0.8$).

Motivation to change

Men expressed a high desire to quit smoking ($M = 4.2, SD = 0.9$), improve their diet ($M = 4.1, SD = 0.8$), and increase their exercise ($M = 4.0, SD = 0.6$) during the pregnancy. Scores on motivation to change did not differ statistically for smoking, diet, and exercise.

Correlations of teachable moments constructs with motivation to change

For the smoking variables, perceived risk was related strongly to motivation to quit ($r = 0.77, 90\% \text{ CI} = 0.61\text{--}0.87$; see Table 2). Feeling proud for not smoking also was related to motivation to quit ($r = 0.57, 90\% \text{ CI} = 0.32\text{--}0.75$), as was self-image ($r = 0.55, 90\% \text{ CI} = 0.29\text{--}0.73$). For the diet variables, only self-image was statistically significantly related to motivation to improve diet ($r = 0.48, 90\% \text{ CI} = 0.20\text{--}0.69$). Risk perceptions about diet and emotional responses about diet were not related to motivation to improve diet. For exercise, no teachable moment constructs were associated with motivation to improve exercise.

Discussion

Several potentially important findings emerge from this small pilot study. First, Latino expectant fathers report heightened risk perceptions, emotional responses, and changes in self-image regarding their health behaviors during pregnancy. Thus, pregnancy may be a 'teachable moment' or a time when Latino men may be more amenable to changing health habits. Second, pregnancy might be more of a teachable moment for expectant fathers to quit smoking than to improve diet or exercise. Third, Latinos reported agreement with constructs of the teachable moment model was related to motivations to quit smoking in ways consistent with those proposed in the conceptual model.

In this sample, Latino expectant fathers reported being motivated to make behavior changes during the pregnancy. This is not surprising as 70% of smokers report they want to quit

smoking (CDC 2007). However, many Latinos are non-daily or low-level daily smokers (Zhu *et al.* 2007) and may not view their smoking as a problem that needs changing. Thus, they may not report as strong a desire to quit smoking. It is possible that expectant fathers' strong desire to quit is more of an indication of the effect of pregnancy than just typical desire to quit smoking. Latinos also viewed their health behaviors as potentially harming the pregnancy, viewed their role as helping their partners to have a healthy pregnancy, and reported emotional reactions related to the effect of their behaviors on the pregnancy. This finding is somewhat inconsistent with one study that indicates that men may expect women to protect the health of the baby (Donovan 1995). Latino expectant fathers may feel that they are just as responsible as their partners for protecting the fetus. Thus, pregnancy may be a teachable moment for expectant fathers to change their behaviors.

Pregnancy may be a more powerful teachable moment for quitting smoking than for improving diet or exercise. Expectant fathers measured higher on teachable moment constructs for smoking than for diet and exercise. This stronger endorsement might indicate that expectant fathers believe their smoking has a bigger impact on fetal health than their diet or exercise patterns. It is possible they feel more responsible for the effects of the smoke that they generate and recognize that their partners are not at all responsible for this behavior; only men bear responsibility for their smoking. On the other hand, even if the men's failure to eat well and exercise influences women's behaviors, women still bear most of the responsibility for their own diet and exercise choices. Therefore, men might feel less motivated to change their own diet and exercise patterns. Therefore, pregnancy could be a time when expectant fathers inherently are receptive to smoking cessation messages, but might be less so to messages about other changes in health behaviors. Interventions could capitalize on the teachable moment of pregnancy to emphasize that it is an ideal time to quit smoking. We are currently developing a couple-based intervention to promote smoking cessation among expectant Latino fathers. We hope to emphasize pregnancy as a teachable moment by increasing risk perceptions with information about the effect of environmental tobacco smoke on the fetus and thus appealing to the fathers' desires to be good protective parents to their children. Similarly, we will provide emotional testimonials from other expectant fathers who talk about being a good role model for their children. It could be that pregnancy will be a stronger teachable moment for first time fathers as this typically represents a notable change in self-image. On the other hand, men who are already fathers may already understand the responsibility of being a father, and when they learn about the potential harm from their smoking, they may be more motivated to quit than men who cannot visualize what fatherhood means.

Additional support for this idea that partners' pregnancies create a teachable moment for quitting smoking comes from the finding that the teachable moment constructs were correlated with motivation for change, particularly for smoking cessation. Expectant fathers who felt their smoking increased risk of harming the fetus, had an emotional reaction to their smoking around the pregnant spouse and believed that it was their job to do whatever was necessary to make the pregnancy healthy were more likely to report being motivated to quit smoking. These high correlations between teachable moment constructs and motivation lend more credibility to the teachable moment model. However, given the teachable moment constructs for diet and exercise were not as strongly correlated with motivations for change, the teachable moment model may not be as applicable for these behaviors during pregnancy.

Results of this study should be viewed with some caution. The sample was small, limiting power. We did not assess country of origin or length of time in the USA. Also, many women were not eligible because they were not partnered to someone who smokes. However, given the smoking rate among Latinos is about 21%, the low-study inclusion rate would be expected. However, despite the small sample size, strong correlations were found between

teachable moment constructs and motivation. Furthermore, the data were cross-sectional, which precludes any tests of temporal causality. Also, all men were expectant fathers; therefore, we could not test independently whether pregnancy itself was a teachable moment, as such an analysis would require a control group of non-expectant fathers. However, we were able to test the differences between other health habits and smoking variables. In addition, most of the measures for this study were single-item and motivation to quit smoking, not actual cessation, was our outcome variable. On the other hand, a strength of this study is that it is one of the first empirical studies to examine teachable moment constructs. Also, because all measures were in Spanish, we were able to reach a typically marginalized population, recently immigrated Latinos.

In summary, Latino expectant fathers report wanting to change their health behaviors during pregnancy; however, the partner's pregnancy seems to have a stronger effect on their attitudes about their smoking than on their attitudes about diet and exercise. Thus, pregnancy may be an opportune time to intervene with Latino expectant fathers to help them quit smoking.

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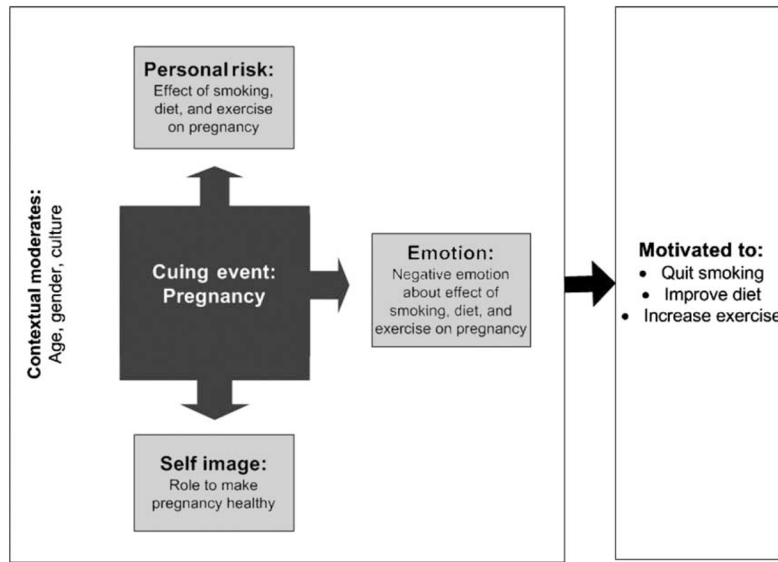


Figure 1. Teachable moment model for behavior change among expectant Latino fathers.

Table 1

Mean differences on teachable moment constructs for smoking vs. diet and smoking vs. exercise (paired *t*-test)^a.

Teachable moment construct	Mean (SE)			Mean (95% CI)	
	Smoking	Diet	Exercise	Difference score (smoking vs. diet) ^b	Difference score (smoking vs. exercise) ^b
Risk perception	4.4 (0.5)	3.3 (1.3)	3.3 (1.3)	1.1 (0.6–1.7)	1.1 (0.6–1.6)
Emotion: feel bad	3.9 (1.1)	3.1 (1.2)	2.6 (1.2)	0.9 (0.5–1.3)	1.0 (0.3–1.6)

^aSelf-image is not presented because only one item measured this construct, and it was not linked to any specific health behavior (smoking, diet, or nutrition).

^b*t*-Test for the null hypothesis that the difference score is equal to zero: all *p*-values less than 0.0001.

Table 2

Correlations^a and 90% CI of teachable moments constructs with motivation to change^b.

Constructs	Motivation to change					
	Quit smoking		Improve diet		Improve exercise	
	<i>r</i>	90% CI	<i>r</i>	90% CI	<i>r</i>	90% CI
Risk perception						
My (<i>smoking/diet/lack of exercise</i>) harms pregnancy	0.77	0.61, 0.87	-0.12	-40, 0.20	0.005	-30, 0.31
Emotions						
Feel bad when (<i>smoke/eat unhealthy/don't exercise</i>)	0.33	0.02, 0.58	0.07	-24, 0.38	-0.001	-0.31, 0.31
Proud when don't smoke	0.57	0.32, 0.75	-	-	-	-
Self-image						
See role as making pregnancy healthy	0.55	0.29, 0.73	0.48	0.20, 0.69	0.23	-0.07, 0.50

^aCorrelations (*r*) and 90% confidence interval (CI) calculated with Fisher's *z*-transformation.

^bConfidence intervals are for correlations coefficients, and thus, can have both positive and negative values. CIs that do not contain the number '0.0' are considered statistically significant.