Original Article

Support for Self-Management and Prenatal Health Behavior Change: Implications for Pediatric Promotion of Interconception Care

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Abstract

Pediatricians increasingly endorse a dual generation approach to health, in which parental health behaviors are recognized as critical to promoting child health. Positive parental behaviors often emerge during pregnancy, for reasons that remain incompletely described. We surveyed mothers in the immediate postpartum period to identify beliefs about health behavior change and characteristics of prenatal care associated with successful change. Sampling at a tertiary care hospital captured an English-speaking adult population with healthy infants. Respondents (n = 225) were predominantly non-Hispanic Black (64%) and Medicaid insured (44%). Most (71%) reported successful behavior change during pregnancy. Of those reporting change, 91% intended to sustain behaviors postnatally. Most believed that sustained change was important for their own health (94%) and their infant's health (93%). In logistic regression, support for self-management was associated with prenatal health behavior change (odds ratio = 1.64, 95% confidence interval = 1.09-2.46). Continued support for self-management by pediatricians may benefit long-term family health.

Keywords

prevention, health care delivery, preconception care, health behavior, pediatrics, support for self-management

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Introduction

Interconception care is care directed to adults who are already parents with the goal of improving outcomes in future pregnancies. It represents a subset of preconception care, which is considered a key strategy for preventing preterm births and other adverse pregnancy outcomes.[1] Pediatricians have long accepted a role in promoting preconception care and may have a particular role to play in interconception care, as many parents access care more frequently for their infants than for themselves.[2,3]

Many health topics that fall under the purview of interconception care relate to health behaviors. For example, one model of interconception care addresses tobacco use, behavioral health care, contraception use, and vitamin use.[4] However, it is often considered difficult to promote positive health behaviors among new parents. In contrast, pregnancy is considered a time when women are particularly able to adopt positive health behaviors.[5] For example, during pregnancy women have particular success with behaviors related to smoking cessation and weight management.[6-8] Understanding the factors that support positive health behaviors during pregnancy is relevant to pediatricians attempting to sustain or enhance those behaviors during the interconception period.

Multiple factors may account for the relative ease of behavior change during pregnancy. Access to health

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insurance and health care utilization both increase with pregnancy.[9,10] In addition, pregnant women often become eligible for services such as WIC (Women, Infants, and Children), home visiting, or employer-based wellness programs.[11,12] Women may also receive increased support from social networks during pregnancy.[13] Finally, there are intrinsic changes in health beliefs, efficacy, and physiology that occur.[5,14]

However, behavior change models suggest that, similar to the prenatal period, the interconception period should be a favorable time for health behavior change.[15] Women's recent experiences with positive behaviors during pregnancy should increase knowledge of behaviors' importance, increase self-efficacy, and establish habits. In addition, women remain in frequent contact with the health care system as they seek routine care for their infants. Understanding key factors that drive behavior change during pregnancy could allow health systems to replicate these features in pediatric settings.

The role of receiving an adequate volume of prenatal care to promote positive birth outcomes is well established, but less is known about particular characteristics of prenatal care that may influence health behavior.[16] Outside of pregnancy, one characteristic linked to health behavior is support for self-management. Conceptually, support for self-management was developed as part of the Chronic Care Model.[17] Common items assessing support for self-management in the clinical setting address goal setting and identification of barriers to change.[18] In clinical interventions addressing pregnancy-relevant conditions such as diabetes, hypertension, and mental health, support for self-management has consistently been linked to improved outcomes.[19-22]

In this study, we sought to better understand characteristics of prenatal health care that may be associated with health behavior change during pregnancy. We were interested in characteristics describing receipt of preconception care, volume and adequacy of prenatal care, continuity of care, and support for self-management. Finally, in the immediate postpartum period, we assessed women's beliefs about sustaining health behaviors into the interconception period.

Methods

Population and Setting

This cohort study was conducted at a single academic tertiary care hospital. The hospital is 1 of 6 obstetrical hospitals in a large US city and is responsible for approximately 4200 deliveries per year. We sampled women admitted to the well-baby postpartum floor between September 2016 and July 2017. Sampling relied in part on availability of the research team but also followed a set protocol to minimize bias. Following this protocol, women were excluded if they were under 18 years of age, did not speak English, or due to nursing concerns. Exclusions were documented. Once eligible women were identified, enrollment proceeded based on room number.

Surveys were conducted by study staff who had prior experience with our patient population, either as nursing students or as scribes in our hospital. Surveys were administered on a tablet, using RedCap (Research Electronic Data Capture), a secure technology to administer surveys electronically.[23] Participants had the option to complete the survey themselves or to complete it with assistance from study staff. Approximately 87% of women requested assistance, anecdotally to accommodate continued care of their infant while completing the survey. Survey time (including informed consent) was approximately 10 to 20 minutes. Participants were compensated with a US$10 gift card. This study was approved by institutional review boards at our institutions.

Dependent Variable: Health Behavior

Because we did not assume we could anticipate the full range of health behaviors adopted by women, we asked broad questions about prenatal health behavior change. We were unable to find items of this nature that were previously tested, so items were developed internally. First, we asked the yes/no question, "Did you make any changes when you found out you were pregnant to try to stay more healthy?" For those who responded yes, we asked the open-ended question, "What did you change?" We then asked several yes/no follow-up questions, including "Do you plan to continue that change now that you've had your baby?" "Do you think it's important for your health to continue that change?" and "Do you think it's important for your baby's health to continue that change?"

Pilot testing found these questions were easily understood by respondents. Open-ended follow-up questions validated that questions cued participants to consider behaviors that are relevant to healthy pregnancy outcomes. Our survey also included validated items on specific behavior changes during pregnancy, from sources such as Pregnancy Risk Assessment Monitoring System (PRAMS) and the Behavioral Risk Factors Surveillance Survey (BRFSS).[24,25] These items addressed smoking, sugar-sweetened beverage consumption, and physical activity during pregnancy. Correlation with validated items suggested that, as intended, we captured a broader range of behavior change with broad questions than with previously validated items on specific topics.

Key Independent Variables: Health Care Characteristics

Utilization. We asked about prenatal and preconception care using items from the PRAMS. We considered women to have received preconception care if they reported seeing a doctor or nurse for their health in the year prior to pregnancy. We did not assess the content of this care (ie, whether preconception care topics were addressed).

Consistent with the Pennsylvania PRAMS data, fewer than 20% of women reported late prenatal care. Therefore, we collapsed utilization into a dichotomous variable indicating whether women received both preconception and prenatal care, or prenatal care only. Only 35% of participants received preconception care in our health system, making self-report of preconception care a more accessible measure of utilization than chart review.

Approximately 50% of women (n = 113) received prenatal care documented in our electronic health record. For these women, we abstracted records to calculate both a total count of prenatal visits and the Adequacy of Prenatal Care Use Index.[16]

Support for Self-Management. We assessed support for self-management using 2 items developed for the Agency for Healthcare Research and Quality Consumer Assessment of Healthcare Providers and Systems(CAHPS) to evaluate patient-centered medical homes.[18] Adapted to refer to prenatal care, these items read, "During this pregnancy, did someone from this provider's office talk to you about specific goals for your health?" and "During this pregnancy, did someone from this provider's office ask you if there are things that make it hard for you to take care of your health?" This yielded a 0 to 2 scale.

Approximately 74% of participants (n = 167) received health care in the year prior to pregnancy. For these women we also assessed support for self-management in the year prior to pregnancy.

Continuity of Care. Continuity of care has been described as an important feature of preventive care.[26] We assessed continuity of care by asking whether participants had seen the primary clinician responsible for their prenatal care prior to pregnancy, for non-pregnancy-related care. If they responded "yes" or if they received prenatal care in the same health system in which they had received preconception care, we considered them to have experienced continuity of care.

Other Covariates

Insurance status at the time of delivery was abstracted from the mother's chart and was collapsed to Medicaid versus non-Medicaid. Race/ethnicity, educational attainment, work status during pregnancy, and relationship with baby's father were self-reported during the survey. Perceived health risk during pregnancy was assessed by asking, "Were you considered high risk during this pregnancy?"

Analysis

Analysis was conducted using Stata 15.[27] We first described the prevalence of health behavior change for the entire population. For the subgroup who reported health behavior change, we described intention to sustain health behaviors in the interconception period and beliefs about the health consequences of sustaining behaviors.

We then used logistic regression with successful health behavior change as the dependent variable and characteristics of care as the key independent variables. Regression also controlled for demographic factors and perceived risk. Because many variables from our theoretical model were not significant (with a P value of 0.05) in our analytic model, we used Akaike's information criterion to evaluate the fit of our model. Akaike's information criterion suggested that removing variables did little to improve our model; therefore, we continued to include variables that we considered theoretically important. We then calculated predictive probabilities to estimate the number of women who would have successfully achieved behavior change if all women had received optimal support for self-management versus if no women had received support for self-management.

We also conducted 2 subgroup analyses. First, for those who received preconception care (n = 167), we examined whether support for self-management in the preconception period was independently associated with behavior change during pregnancy. We did this using a logistic regression similar to that described above, which also included a 0 to 2 variable describing response to the support for self-management questions referencing the preconception period. Second, for those whose prenatal care was documented in our system (n = 113), we were able to quantify the number of prenatal visits, using a validated measure, the Adequacy of Prenatal Care Utilization (APNCU).[16] For this subgroup we conducted a regression that included prenatal visit count and APNCU in our predictive model.

Results

There were 367 women considered for inclusion in this study. Of these women 75 (20%) were never approached for the following reasons: limited English proficiency

Table 1. Characteristics of Study Population.

Characteristics	Reported Behavior Change, n = 159	Did Not Report Behavior Change, n = 66	Total, N = 225
Maternal characteristics			
Age (mean/SD)	28.8 (5.6)	29.4 (4.9)	29.0 (5.4)
Race/ethnicity, n (%)			
Non-Hispanic Black	103 (65%)	40 (61%)	143 (64%)
Non-Hispanic White	25 (16%)	12 (18%)	37 (16%)
Other	31 (20%)	14 (21%)	45 (20%)
Educational attainment, n (%)			
High school or less	57 (36%)	23 (35%)	80 (36%)
Some college	44 (28%)	15 (23%	59 (26%)
College degree	58 (36%)	28 (42%)	86 (38%)
Medicaid insurance, n (%)	66 (42%)	34 (52%)	100 (44%)
Employed during pregnancy, n (%)	132 (83%)	53 (80%)	185 (82%)
Relationship with father of baby, n (%)			
Living with mother	92 (58%)	46 (70%)	138 (61%)
Not living together but father involved	39 (25%)	9 (14%)	48 (21%)
Not involved	28 (18%)	11 (17%)	39 (17%)
Health care utilization, n (%)			
Prenatal care in first trimester	137 (86%)	55 (83 %)	192 (85%)
Preconception care	122 (77%)	45 (68%)	167 (74%)
Continuity of care	65 (41%)	29 (44%)	94 (42%)
High-risk pregnancy	51 (33%)	14 (21%)	65 (29%)

Table 2. Receipt of Self-Management Support.

	Preconception Period, N = 167	Prenatal Period, N = 225
Talk about specific goals	93 (56%)	153 (68%)
Talk about things that make it hard to take care of health	72 (43%)	103 (46%)

(n = 9), not available when study staff were on the floor (n = 43), nursing concerns (n = 17), or reason not provided (n = 6). We approached 292 women for participation, and 238 (82%) consented and completed the survey. We subsequently excluded another 13 (5%) because of missing data on key variables, leaving us with a final sample of 225.

Study participants averaged 29.0 (SD = 5.4) years of age (Table 1). They were predominantly non-Hispanic Black (64%). Educational attainment varied with 36% reporting a high school education or less, 26% reporting some college, and 38% reporting college or graduate degrees. Medicaid insurance covered 44% of women at the time of delivery.

Regarding health behavior change 71% reported successfully changing behaviors during pregnancy. Of women who made changes, 91% intended to continue these changes in the interconception period. Participants who made changes during pregnancy believed that sustaining these changes would be important for their own health (94%) and the health of their infants (93%).

Support for self-management during pregnancy was higher than during the preconception period (χ^2 $P <$ 0.001; Table 2). During pregnancy, 68% of women reported talking with their clinicians about specific goals for their health and 46% reported talking about things that made it hard for them to take care of their health.

In regression analysis (Table 3) support for self-management was positively associated with increased odds of reporting behavior change (odds ratio [OR] = 1.64, 95% confidence interval [CI] 1.09-2.46, P = 0.02). Medicaid insurance was negatively associated with successful behavior change (OR = 0.40, 95% CI = 0.18-0.86, P = 0.02). As described above, regression also controlled for receipt of preconception care, continuity between preconception and prenatal care, maternal

Table 3. Association Between Characteristics of Clinical Care and Behavior Change During Pregnancy.

	OR (95% CI)	*P*
Utilization		
Support for self-management (prenatal)	1.64 (1.09-2.46)*	0.02
Preconception care and first trimester prenatal care	1.25 (0.64-2.45)	0.51
Continuity between preconception and prenatal care	0.86 (0.45-1.63)	0.64
High-risk pregnancy (self-report)	1.56 (0.74-3.27)	0.24
Demographics		
Age (years)	0.97 (0.90-1.04)	0.33
Race/ethnicity		
Non-Hispanic White	—	
Non-Hispanic Black	0.97 (0.35-2.53)	0.96
Other	0.80 (0.28-2.33)	0.68
Educational attainment		
High school or less	—	
Some college	1.19 (0.53-2.74)	0.67
College degree	0.64 (0.26-1.56)	0.32
Medicaid insurance	0.40 (0.18-0.86)*	0.02
Employed during pregnancy	1.64 (0.71-3.82)	0.25
Relationship with father of baby		
Living with mother	—	
Not living together but father involved	1.99 (0.80-4.89)	0.14
Not involved	1.21 (0.49-2.97)	0.68

Abbreviations: OR, odds ratio; CI, confidence interval.
*$P < 0.05$.

perception of risk during pregnancy, maternal age, race/ethnicity, educational attainment, employment during pregnancy, and relationship with baby's father. None of these factors were associated with odds of behavior change. Using predictive probabilities, we estimated that 75% of women would have successfully achieved health behavior change if all women had received optimal support for self-management during prenatal care and only 56% of women would have achieved behavior change if no women had received support for self-management.

In subgroup analysis, among the 167 women who received preconception care, support for self-management during the preconception period was not associated with behavior change during the prenatal period. In addition, among the 113 women receiving prenatal care in our system, neither count of prenatal visits nor adequacy of prenatal care as assessed by a validated scale was associated with behavior change in the prenatal period.

Discussion

We found a positive association between support for self-management in the clinical setting and prenatal behavior change. In addition, during the immediate postpartum period, study participants almost universally believed that sustaining health behaviors would benefit both themselves and their infants. We found no association between volume or adequacy of care and successful prenatal behavior change. Support for self-management is a characteristic of care that can be replicated in pediatric settings. Our findings suggest that this characteristic of care deserves further attention as pediatricians seek to develop interconception services.

Support for self-management has been established as an important driver of outcomes in a variety of conditions including diabetes, hypertension, and mental health.[19-22] Deriving from the Chronic Care Model, support for self-management has entered other clinical-behavioral frameworks as well. In 2015, it was incorporated into Agency for Healthcare Research and Quality items evaluating the Medical Homes. These items were developed following focus groups with patients, and parents of patients, that explored experiences with Medical Homes domains and ambulatory care.[18] Support for self-management has also been linked theoretically to patient activation.[28]

To our knowledge, this is the first time that support for self-management has been assessed with regard to prenatal care. Our participants reported higher rates of support for self-management in the prenatal period than

in the preconception period. The cross-sectional nature of our study may have introduced recall bias into this comparison, so we comment on this with caution. However, our findings are suggestive that there may be certain characteristics of prenatal care that are well suited to promoting behavior change, distinct from the frequency of care received during pregnancy or the intrinsic motivation of pregnant women.

We found no relationship between support for self-management in the preconception period and behavior change during pregnancy. This may suggest that support for self-management is particularly impactful during pregnancy. However, there are alternative explanations for this null finding as well. First, we did not ask questions about behavior change in the preconception period, which may have been more affected by support for self-management in that time period. Second, we may simply have been underpowered to detect an association in this subgroup analysis.

We did find a negative association between Medicaid insurance and successful behavior change during pregnancy. Importantly, Medicaid receipt was our only proxy for income. We were able to control for low educational attainment, partner support, and employment during pregnancy, factors that may track with income. However, even controlling for these factors, Medicaid was important in our predictive model, perhaps reflecting the importance of material resources to achieve change. Alternatively, this finding could represent differences in care received by Medicaid versus non-Medicaid recipients. On average, Medicaid recipients had 2 fewer prenatal visits than non-Medicaid recipients. There were no differences in receipt of preconception care, continuity of care, or receipt of support for self-management.

Respondents to this survey were primarily non-Hispanic Black and delivered at a single hospital, which may limit generalizability. However, Black women in the United States are at particularly high risk of preterm birth and other adverse birth outcomes.[29] Therefore, understanding health behavior change in this population may be of particular importance to improving outcomes for mothers and infants.

This study has several other limitations. First, though we attempted to minimize selection bias, we may have been less likely to speak with women who were in the hospital for shorter periods of time. Allowing nurses final determination in who we approached was necessary to ensure we did not interfere with care. However, we may have undersampled mothers experiencing high levels of distress in the immediate postpartum period, whose experience with behavior change may have been distinct. We also did not capture the experience of non–English-speaking mothers. Second, we relied on broadly worded, but unvalidated, questions about health behavior change. We chose to take this approach because we did not want to misclassify women by assuming we could ask about all changes they may have considered. Our reliance on self-report of behaviors is consistent with national and local strategies for evaluating behaviors. However, we could not verify that reports were consistent with behaviors actually performed. Finally, we conducted this survey at a single time point, making it difficult to compare reports of experience with care at different time points. We interpret comparisons of reported experience with preconception care and prenatal care with caution, due to the possibility of recall bias.

Conclusion

Support for self-management may have played a role in prenatal behavior change. In addition, postpartum women believed that sustained behavior change would benefit both maternal and child health. Our findings suggest that key drivers of health behavior change, as described by theoretical models, are aligned for success in the early interconception period. Continued support for self-management in the pediatric setting may benefit women, their children, and future pregnancies by promoting positive health behavior at the parent level. These findings warrant replication with methods that capture health behaviors and outcomes directly, instead of relying on self-report.

Author Contributions

EFG: Contributed to conception and design; contributed to acquisition, analysis, or interpretation; drafted the manuscript; critically revised the manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.
CSW: Contributed to conception and design; contributed to analysis and interpretation; critically revised the manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.
MM: Contributed to conception and design; critically revised the manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.
DMR: Contributed to conception and design; critically revised the manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.
SAL: Contributed to conception and design; contributed to analysis and interpretation; critically revised the manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

Declaration of Conflicting Interests

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