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Applying the chronic care model to prenatal care: Patient activation, productive interactions, and prenatal outcomes

Christy J.W. Ledford[a], Kerry P. Sadler[b], Jeremy T. Jackson[c,*], Jasmyne J. Womack[c], Heather A. Rider[c], Angela B. Seehusen[c]

[a] Uniformed Services University of the Health Sciences, Bethesda, MD, USA
[b] Jacksonville Naval Hospital, Jacksonville, FL, USA
[c] Military Primary Care Research Network, 4301 Jones Bridge Road, Bethesda, MD, USA

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ABSTRACT

Objective: To demonstrate how the chronic care model can be applied in prenatal care.
Methods: This study was conducted through analysis of data generated in the women's health and family medicine departments of one community hospital and two medical centers across three states (Georgia, Nevada, and Virginia). 159 low-risk obstetric patients were monitored throughout their pregnancy for patient activation and biometric measures including: blood pressure at each appointment, baby's gestational age at birth, and mode of delivery. Patient activation was assessed with the validated, licensed patient activation measure.
Results: Patient activation was strongly associated with the Prenatal Interpersonal Processes of Care metric ($F(2, 155) = 3.41$, $p < .05$). Also, increased age, decreased Prenatal Interpersonal Processes of Care, fewer pregnancies, and increased diastolic blood pressure were associated with an increased likelihood of cesarean delivery and the model correctly predicted 81% of cases.
Conclusion: Women who identified as feeling more activated reported more positive pregnancy experiences, and women who reported more positive pregnancy experiences were more likely to experience a vaginal delivery.
Practice implications: Activated patients, more positive prenatal experience, and improved delivery outcomes can be achieved through applying the chronic care model.

1. Introduction

The chronic care model (CCM) posits that factors of the health system, including, but not limited to, family and self-management support and clinical information systems, cultivate informed, activated patients who share medical decision making with a prepared, proactive healthcare team [1]. The chronic care model [2] theorizes that positive clinical outcomes are the result of an informed, activated patient, who believes that his or her role as a patient is important, who has the confidence and knowledge necessary to take action, and who enacts behaviors to maintain and improve his or her health [3–5].

The activated patient is a collaborative partner with the healthcare team [6]. In the clinic, this patient asks questions and engages in conversations with providers [7]. Although they may share in health decisions or delegate decisions to their provider, activated patients have the knowledge, skills, and confidence to enact treatment recommendations [8].

The chronic care model is a standardized framework for patient care in which a multidisciplinary team fosters a collaborative environment for education and discussion. As a result, the empowered patient actively participates in shared decision making, thereby taking ownership of his or her health. The delivery system in the form of scheduled interval visits with adaptable content are a cornerstone of the model's success in improving patient outcomes [1]. Prenatal care is delivered in a similar fashion – a proactive approach to medicine with episodic appointments that have defined but flexible objectives for each visit.

Organizational tenets of the CCM – episodic visits, multidisciplinary teams, and patient education – closely resemble core elements of prenatal visits. In 1989, the US Public Health Service sought to better define, explain, and improve prenatal care with a revived focus on a team-based medical and psychosocial model of

Abbreviations: CCM, chronic care model; PAM, United States (US) patient activation measure; PIPC, Prenatal Interpersonal Processes of Care.

* Corresponding author.
E-mail address: jtjackson@hjf.org (J.T. Jackson).

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care [9,10]. The landmark document and the supportive literature that followed encouraged a patient and family-centered approach to caring for the expectant mother and her baby from preconception to 1 year [11].

While the optimal number of prenatal visits is disputed, traditional care involves 7–11 visits scheduled in 4 to 6 week intervals throughout the pregnancy [11–14]. The specific timing and content of each visit should be individualized according to the risk stratification and needs of the woman, with some low-risk women eligible for a reduced number of visits with no adverse maternal and fetal outcomes [12,15,16]. Each visit has its own agenda adjustable to the needs of the woman and concerns of the provider. As in the CCM, the exact frequency of visits is less important than the content, counseling, and education covered.

The major organizations influencing prenatal care espouse education as a critical component of prenatal care [11–14]. Prenatal visits are saturated with teaching and counseling to enable a woman to feel comfortable and confident engaging in shared decision making. Maternal health literacy aims to keep the mother as the central player, while incorporating her support structure – family, friends, support groups – as influential advisors [17]. Education spans multiple subjects to include nutrition, exercise, medications, pregnancy, parenting, anticipatory guidance, breast-feeding, occupational and environmental exposures, postpartum depression and others. This content has been shown to influence a more positive outlook during pregnancy, improve pregnant women's knowledge foundation, and support self-sufficiency [18].

According to Novick and colleagues [19], the qualities of the activated patient mirror those characteristics that contribute to a positive prenatal experience. The integrative review of women's experiences of prenatal care found that women valued provider continuity; engaging in shared decision making with the medical team; and comprehensive care to include social, educational and behavioral support networks [19]. Within maternity care, patient activation has been linked to maternal health outcomes, including healthy postpartum weight management [20]. Patient activation is becoming increasingly important as pregnant women engage in shared decision making regarding prenatal decisions such as induction of labor [21,22]

For this application of the chronic care model to prenatal care, two hypotheses were tested.

H1. Pregnant women who report higher patient activation will report higher interpersonal processes of prenatal care.

H2. Pregnant women who report higher level of interpersonal prenatal care will be more likely to deliver via vaginal delivery rather than a cesarean delivery.

2. Methods

This is a secondary data analysis of data generated by a study on patient-provider communication conducted in the women's health and family medicine departments of one community hospital and two medical centers across three states (Georgia, Nevada, and Virginia). At each hospital, the obstetrics intake nurse serially screened new maternity patients for inclusion criteria from May to November 2015. If a woman met inclusion criteria, the nurse invited her to talk to a research assistant about the study. Exclusion criteria included conditions that would elevate her care to complicated obstetrics care (e.g., cardiovascular disease, diabetes mellitus, renal disorder, etc.). This was intended to capture a low-risk obstetrics patient population that would follow a standardized pathway of care, in which women attend a prenatal appointment once every four weeks during pregnancy.

Table 1
Sample characteristics (n = 159).

Race	Asian/Pacific Islander	13	(8.2%)
	Black/African American	22	(13.8%)
	White/Caucasian	108	(67.9%)
	Choose not to respond	9	(5.7%)
	Multi-answer	7	(4.4%)
Ethnicity	Hispanic	23	(14.5%)
Education	Less than high school	2	(1.3%)
	High school or equivalent	25	(15.7%)
	Some college	75	(47.2%)
	Bachelor's degree	41	(25.8%)
	Post bachelor's degree	15	(9.4%)
Mean age		26.87	(sd 4.72)
Mean number of pregnancies		2.06	(sd 1.30)
Mean patient activation		77.39	(sd 14.81)

At baseline, self-reported measures included demographics, and patient activation. Patient activation was assessed with the validated, licensed patient activation measure (PAM) [4,23–25]. The scale includes 13 Likert-type items, such as "Taking an active role in my own health care is the most important thing that affects my health," "I am confident that I can tell a doctor concerns that I have even when he or she does not ask," and "I am confident I can figure out solutions when new problems arise with my health." The 13 items combine to create a continuous patient activation measure on a scale of 0 (not activated) to 100 (most activated), that can also be classified into 4 ordinal levels. PAM was repeated at time 4 (32-week appointment).

Following each appointment, the pregnant women completed five subscales of the validated Prenatal Interpersonal Processes of Care (PIPC) scale [26], including elicitation/responsiveness to the patient, explanations of care, empowerment, patient-centered decision making, and emotional support. Responses to each item were transformed onto a 0 (negative perception) to 100 (positive perception) scale, and items are averaged to create subscales. Subscales are then averaged to calculate the overall PIPC scale. Across time points in this study, the PIPC scale's internal reliability (Cronbach's α) ranged from 0.787 to 0.854.

Biometric measures collected from the electronic health record included: blood pressure at each appointment, baby's gestational age at birth, and mode of delivery (vaginal or cesarean delivery).

3. Results

Of the 258 women assessed for eligibility, 241 completed consent. After consent, 22 women experienced a miscarriage or abortion, 15 delivered earlier than 36 weeks gestation, and 37 delivered outside of our research site hospitals. Of the remaining 167 cases, 8 women who had scheduled repeat cesarean deliveries are also excluded due to the likely increased risk in their deliveries. Therefore, 159 cases are included in this analysis. Table 1 presents sample characteristics.

At each time point, some participants did not complete a survey for the following reasons: arriving early for appointment (without research-assistant notification), declining survey after appointment due to time constraints, and clinic-canceled appointments due to weather conditions. No one mother missed more than one survey. Missingness ranged from 2.4% to 23.4%; which is similar to the missing rate of 15% to 20% common in psychological studies [27]. For these missing items, we compared women who completed the item to women who did not complete the item. No demographic differences were detected, creating no pattern of missingness. For the missing items, linear regression imputation was used on individual sub-scaled items.

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