



## Becoming a Mom: Improving Birth Outcomes through a Community Collaborative Prenatal Education Model

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### Abstract

**Purpose:** Maternal/infant health outcome disparities continue to exist within the United States despite years of research and intervention. The need for collaborative community-based efforts was identified as an important strategy to improve birth outcomes.

**Objective:** Evaluate the impact of a group prenatal education curriculum at increasing maternal health knowledge and decreasing negative maternal/infant health outcomes.

**Methods:** Pregnant women were referred to the program by community obstetric providers. The group prenatal education program was delivered by the local health department through a series of six classes to groups of women with varied due dates. Participants completed pre and post knowledge assessments and health outcome data was abstracted from medical records.

**Results:** The majority of participants (N=103) were Caucasian (n=83, 83%), English speaking (n=89, 86%), 21-30 years of age (n=71, 71%). Participants significantly increased knowledge in topics of preterm labor (85% vs. 95%,  $p<.0001$ ), postpartum symptoms (80% vs. 89%,  $p<.0001$ ), and safe sleep (84% vs. 99%,  $p=.0003$ ). Participants used tobacco at a lower rate during pregnancy than regional comparisons (8% vs. 20%,  $p<.05$ ).

**Conclusion:** This study increased the number of pregnant women attending group prenatal education classes and was associated with positive knowledge and health outcomes. The program was offered as a compliment to existing prenatal care services, suggesting the collaboration resulted in a better utilization of existing community resources.

### Keywords

Prenatal education, Birth outcomes, Collaborative community-based intervention, Cesarean birth

Maternal and infant health outcome disparities continue to exist within the United States despite years of research and intervention. Factors related to disparities include socioeconomic status, educational attainment, discrimination, biologic and genetic characteristics, behavior, environment, race/ethnicity, and quality of care [1]. Infant mortality is a key indicator of overall community health [2]. The leading causes of infant death include short gestation, low birth weight, sudden infant death syndrome and maternal complications of pregnancy [3,4]. The need for collaborative community-based efforts from multidisciplinary teams was identified as a priority by national leaders as an important strategy to address

the health disparity gap in birth outcomes. A focus on preconception health and enhanced prenatal care has been recommended as strategies for finding solutions [5].

Group prenatal education paired with quality prenatal care has the potential to greatly impact some of the leading causes of infant death [6,7]. Impact could be the greatest in rural settings where patients frequently have higher non-compliance rates, lower health literacy, and other factors associated with poor health outcomes [8]. High risk populations have a particular need for optimal prenatal care and health education. Using group prenatal education through a community collaborative model may improve health outcomes for these patients [9].

The Greater Kansas Chapter of the March of Dimes developed plans for implementing birth disparities programs in targeted communities across the state with the philosophy that every effort should be made to prevent the occurrence of preterm birth and reduce the associated infant mortality rate. The purpose of implementing this program was to advance patient education, assist and augment existing public health services, and clinically intervene in prenatal and pre/interconception periods. The primary goal was to improve birth outcomes by changing the attitudes and behaviors of participants in order to impact community-specific risk factors and to implement prevention strategies.

The objective of this pilot study was to evaluate the impact of the March of Dimes group prenatal curriculum delivered through a community collaborative effort at increasing maternal health knowledge and decreasing negative maternal and infant health outcomes when compared to traditional prenatal care without group education.

### Method

#### Community collaborative model

The Kansas Chapter of the March of Dimes developed a pilot birth disparities program in Salina, Kansas. The foundation for this pilot was the development of a community collaborative effort bringing together the county health department, the federally qualified health center (FQHC), and other community prenatal care providers. The community collaborative model creates a long-term, sustainable public/private partnership among clinical and public health partners

at the local and state level. It leverages existing resources (staff, educational materials, facilities, clinical services, etc.) supported by Title V funding, Medicaid and foundation grants.

## Setting

The prenatal health education program was delivered in a rural community-based location led by the county health department. Child care and transportation were offered as part of the program to address common attendance barriers. The classes were held at the local FQHC.

## Program

The community group-based prenatal health education component utilized the March of Dimes *Becoming a Mom/Comenzando bien* bilingual curricula delivered by the county health department at the local FQHC. Participants were referred to the program by community obstetric providers. During routine prenatal appointments, patients were given information prescriptions to attend the prenatal health education program.

The curriculum included six sessions on the following topics: basic health during pregnancy, prenatal care, healthy eating, stress management, alcohol and tobacco use, labor and birth, caring for an infant, postpartum care, interconception health, and community support services. The curriculum emphasized the importance of breastfeeding, signs of preterm labor, safe sleep, and substance use which highlights tobacco cessation (March of Dimes' recommendation from premature birth report card) [10] as these modifiable behaviors are likely to improve infant health outcomes and address the high infant mortality rate within the community [11-13]. Stress management and reduction [14,15], as well as the importance of early medical intervention were also components of the curriculum as they are strong factors related to preterm birth [16,17]. The curriculum included an emphasis on risks of early induction of labor and cesarean deliveries as recommended in the 2011 Kansas premature birth report card [10]. Lastly, there was an emphasis on existing support services available to pregnant women through community agencies and resources incorporated into each session. Participants were incentivized to participate and earned a material item corresponding to the number of classes attended (e.g., diapers for one class, safe-sleep crib for six classes).

## Outcome data

The program included a pre/post evaluation tool to assess knowledge. The questionnaire included approximately 100 questions and included demographic and healthy lifestyle/pregnancy questions. The evaluation tool was first developed in Texas by March of Dimes health education program grantees. It was reviewed by a team of content experts and community partners and modified to improve clarity of questions. It was administered at the first and last prenatal education sessions with a participant consent form. The consent form included information and participant consent for sharing de-identified health data from medical records with program staff. Health outcome data was obtained through medical record abstraction. Comparison health outcome data was obtained from the Kansas State Health Department Office of Vital Statistics birth certificate data [18]. Regional comparison data for neighboring counties was included to match participant demographics and rural setting.

## Statistical analysis

A two-tailed Chi square test was used to compare health outcomes of participants to regional averages and to compare pre/post knowledge questionnaire results. IBM SPSS predictive analytics software version 19 was used to analyze data. The study was approved by a university institutional review board and research was conducted in accord with prevailing ethical principles.

## Results

The program served 103 women from January 2013- May 2014. The majority of participants were Caucasian (n=83, 83%), English speaking (n=89, 86%), 21-30 years of age (n=71, 70%), employed fulltime (n=60, 61%), and had earned a college degree (n=55, 54%). Most participants were not enrolled in Women, Infant, and Children services (n=60, 58%), had private insurance (n=55, 54%) or Medicaid (n=33, 32%).

Women participating in the program reported statistically significantly knowledge improvements in topics of preterm labor (85% vs. 95%, p<.0001), postpartum symptoms (80% vs. 89%, p<.0001), and safe sleep (84% vs. 99%, p=.0003) (Table 1). Three topic areas had high pre-test knowledge results and non-significant post-test differences including, knowledge of a healthy diet (100% vs

**Table 1:** Correct responses pre/post knowledge questionnaires (Pre-test N=103; Post-test N=103)

Topic	Pre Survey N (%)	Post Survey N (%)	Chi Square test
Knowledge of Preterm Labor Signs (ten questions)	57 (85)	89 (95)	$\chi^2=53.597$ , $p<.0001$ , $df=1$
Knowledge of Alcohol and Drug Use before Pregnancy (three questions)	90 (95)	96 (97)	$\chi^2=1.427$ , $p=.2323$ , $df=1$
Knowledge of Postpartum Symptoms (ten question)	46 (80)	78 (89)	$\chi^2=23.512$ , $p<.0001$ , $df=1$
Knowledge of Healthy Diet (two questions)	100 (100)	101 (100)	$\chi^2=0.995$ , $p=0.3185$ , $df=1$
Plan to Breastfeed (one question)	86 (94)	93 (95)	$\chi^2=0.012$ , $p=0.914$ , $df=1$
Knowledge of Safe Sleep Position (one question)	81 (84)	100 (99)	$\chi^2=13.244$ , $p=0.0003$ , $df=1$

**Table 2:** Maternal and infant health outcomes & region averages

Outcome	Participant Sample (%)	Region Averages Sample (%)	Test Statistic
Breastfeeding initiation	(n=63, N=74) (85.1)	(n=595, N=766) (78.1)	$p=0.2056$ $\chi^2=1.602$ , $df=1$
Cesarean delivery	(n=19, N=74) (25.7)	(n=306, N=875) (37.6)	$p=0.1361$ $\chi^2=2.222$ , $df=1$
Low Birth Weight	(n=3, N=74) (4)	(n=65, N=766) (9.3)	$p=0.2781$ $\chi^2=1.176$ , $df=1$
Preterm Birth	(n=4, N=74) (5.4)	(n=68, N=766) (9.7)	$p=0.4229$ $\chi^2=0.642$ , $df=1$
Tobacco use during pregnancy	(n=8, N=98) (8.2)	(n=180, N=766) (20.2)	$p=.0009$ $\chi^2=11.118$ , $df=1$

*Comparison data reported by Kansas Vital Statistics for neighboring counties [18]*

100%,  $p=0.3185$ ), impact of alcohol/drug use on pregnancy outcomes (95% vs. 97%,  $p=0.2323$ ) and intention to breastfeed (94% vs. 95%,  $p=0.914$ ) (Table 1). Participants reported their experience with program as excellent ( $n=91$ , 90%) or good ( $n=10$ , 10%).

Health outcome data was not available for all participants and included 98 women. Participants used tobacco at a statistically significant lower rate during pregnancy than regional averages from 2012 (8% vs. 20%,  $p<.05$ ) (Table 2). Other outcome measures indicated improved rates but differences were not statistically significant including: fewer cesarean deliveries (26% vs. 38%,  $p=0.1361$ ), fewer low birth weight babies (4% vs. 9%,  $p=0.2781$ ), fewer preterm births (5% vs. 10%,  $p=0.4229$ ), and higher breastfeeding initiation rate (85% vs. 78%,  $p=0.2056$ ).

## Discussion

Women participating in the program reported significant knowledge increases related to health behaviors associated with preventing infant mortality, including preterm birth and reported high knowledge regarding the harmful impacts of tobacco use. In addition to positive outcomes, this program offers a collaborative community-based strategy that meets recent calls to action by the Association for Maternal and Child Health Programs to improve health outcomes [1].

In the current economic and healthcare environment, coordination of care and higher utilization of existing services has become increasingly important. This is especially true for mothers and infants. The United States currently has poorer maternal and infant health outcomes than some third world countries [5,19]. This study highlights the importance of collaborate community action to improve maternal and infant birth outcomes.

This study is not without limitations. The study sample was primarily Caucasian limiting the degree to examine how health outcomes could be improved among minority populations. Participants were from a geographically disparate rural community. The program could be used to address related rural health disparities. Knowledge survey results were based on self-reported data and should be interpreted within the context of self-reported data limitations [20]. Another limitation was the lack of paired pre/posttest data resulting in the inability to run stronger statistical tests to examine pre/post changes among participants. Breastfeeding initiation, cesarean delivery rate, low birth weight, and premature birth rates were better than regional averages but not statistically significant. Additionally, participants reported higher levels of education and were more likely to be insured than regional averages [18]. Future efforts should include continued collection of health outcome data, larger sample size, paired pre/posttests, and prioritization of minority participants and those without insurance.

The strengths of this pilot study include the novel use and evaluation of the *Becoming a Mom* program, use of a collaborative community-based approach to improve clinical outcomes, and the utilization of existing resources to create change. The community-based group prenatal education program has been used across numerous states, but has yet to be systematically evaluated. Preliminary findings demonstrate improvements in tobacco use during pregnancy, an important health outcome associated with health complications for mothers and babies [21]. Additionally, this model could be replicated across similar rural settings addressing a component of health disparities within the United States [22]. Future studies are needed to assess the same measures across multiple settings to test the generalizability of the collaborative community-based prenatal education model.

## Conclusion

This study increased the number of pregnant and postpartum women receiving group prenatal education in the community and was associated with positive knowledge and health outcomes. The program was offered as a compliment to existing prenatal care services

and required no additional health department staff, suggesting the collaboration resulted in a better utilization of existing community resources. A key to this collaboration's success was the historical relationships between community agencies, which led to many agencies contributing in-kind donations and resources. The program continues to serve pregnant women in the community post initial grant funding. Without this strong community-based collaborative effort, funding would have been difficult to obtain and preliminary successes would have been delayed, if not unattainable.

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## Ethical Statement

This research was approved by the authors' institutional review board to ensure the protection of human subjects.

## Financial Support and Conflict of Interest

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