Evaluation of a Community-Wide Preterm Birth Prevention Program

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Although there has been progress in reducing the impact of most disease processes that contribute to infant morbidity and mortality, there has been no significant reduction in the incidence of preterm birth in the past 25 years.¹ Preterm birth, defined as any delivery that occurs before 37 weeks gestation, remains the leading cause of neonatal morbidity and mortality, representing one of the most important perinatal health problems in Canada.^{2,3} Some researchers believe that a community-wide approach to intervention is a promising avenue for the reduction of the morbidity and mortality due to preterm birth⁴⁻⁶ and many of these interventions have been recently implemented in communities across Ontario.⁷⁻¹⁰ However, few studies exist to evaluate their effectiveness.

The objective of this study was to evaluate the implementation and outcomes of

the community-wide preterm birth prevention program *Reach, React, Respond*.⁷ The program consisted of visits by public health nurses to all prenatal caregivers to emphasize the need to teach all women the signs of preterm labour and the appropriate response (*Implementation*). The intervention involved caregivers teaching women about these signs and symptoms (*Reach*) and the action women should take if they experience them (*React*). Caregivers were also provided with evidence-based guidelines for the treatment of women in preterm labour with tocolytic and corticosteroid drugs (*Respond*).

METHODS

A multi-phased evaluation was conducted (Figure 1). This evaluation examined changes in knowledge and practice among caregivers (Phase I) through mailed pre- and post intervention surveys of *all* physicians and midwives who provided prenatal care to patients at 18-20 weeks gestational age. Knowledge change among women (Phase II) was assessed with in-person interviews of *all* women who gave birth at a tertiary care hospital during two three-week periods, one before and one after the intervention. The change in use of cortico-

steroids and tocolytics (Phase III) and the effect of the program on the gestational age of infants born to mothers who experienced preterm labour (Phase IV) were examined through a chart review before and after program implementation. Women were eligible for Phases III and IV if they experienced preterm labour during a six-month period prior to or following the implementation of this program. Figure 2 lists the exclusion criteria for Phases III and IV.

RESULTS

Among the 107 prenatal caregivers who provided prenatal care, 73% responded to the pre- and 93% responded to the post program implementation survey. The program was successfully implemented through the academic detailing of care-

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Maternal transfers from another hospital
Preterm deliveries due to:
• Induced or elected delivery
• Premature rupture of membranes
Placental abruption
Incompetent cervix (with cervical cerclage)
Anomalies of the fetus

Figure 2. Exclusion Criteria for Phase III

Phases	Program Steps	Program Description	Evaluation Objectives	Evaluation Methods
Phase I	Implement	Academic detailing of caregivers and dissemination of program materials	Describe change in caregivers' practice	Pre/post survey of caregivers
Phase II	Reach	Universal counselling of pregnant women re: signs and symptoms of preterm labour	Describe change in women's knowledge	Pre/post survey of postpartum women
Phase III	React	Presentation at hospital for assessment at earliest signs of preterm labour	Describe change in antenatal use of corticosteroids and tocolytics	Pre/post hospital medical chart review of administration of drugs
	Respond	Appropriate administration of tocolytic and corticosteroid drugs		
Phase IV	Outcome	Increase in gestational age of babies born to women with preterm labour	Determine change in gestational age	Pre/post hospital medical chart review of gestational age

Figure 1. Framework for Evaluating the Preterm Birth Prevention Program

givers (Table I), demonstrated by the significant increase in the number of caregivers who reported that they educated all pregnant women about the signs and symptoms of preterm birth ($p < 0.05$).

One hundred and two (102) women were interviewed before and 100 women following program implementation, representing 97% of those eligible. Caregivers' education of pregnant women led to a highly significant increase in women's knowledge about preterm labour ($p < 0.001$) and what to do if they experienced signs or symptoms ($p = 0.02$) (Table II).

Thirty-eight (38) women met the criteria for the pre- and 40 women for the post program implementation chart review. This review indicated that there were no significant differences in the administration of corticosteroids or tocolytics before and after program implementation (Table III). There was also no difference when analysis was restricted to women who experienced preterm labour at less than 34 weeks gestational age. Furthermore, regression analysis found no effect of exposure to the program on the gestational age of babies born to women who experienced preterm birth, controlling for marital status and gestational age at the beginning of labour.

DISCUSSION

The implementation step of the program was successful; caregivers accepted program materials and reported teaching their patients about preterm labour. Consequently, women were found to have increased knowledge about preterm labour and how to respond appropriately. However, this study found no significant difference in the proportion of women who received drugs as recommended by evidence-based guidelines. Therefore, no significant results were observed in the overall outcome of interest, the gestational age of babies born to women who experienced preterm labour.

The lack of significant results in this critical outcome may be attributed to a failure in the *React* (presentation at the hospital at the earliest signs of preterm labour) or the *Respond* (appropriate admin-

TABLE I
Caregiver Practice Before and After Program Implementation

Variable	Before N = 66 n (%)	After N = 66 n (%)	Paired Analysis p-value
Patient education materials available			
Yes	12 (18)	43 (65)	<0.001
No	54 (82)	23 (35)	
Discuss signs and symptoms*			
Discuss with all†	23 (36)	38 (60)	0.003
Discuss with high risk only	19 (29)	12 (19)	
Not usually discussed	21 (32)	13 (21)	
When first discussed			
< 20 weeks†	14 (22)	33 (50)	0.005
20 to 26 weeks	19 (29)	15 (23)	
27 to 30 weeks	12 (19)	5 (8)	
> 31 weeks	0 (0)	0 (0)	
Not discussed	21 (30)	13 (19)	

* 3 non-responses; n=63

† Optimal response

TABLE II
Women's Knowledge of Signs and Symptoms of Preterm Labour Before and After Program Implementation

Variables	Before n = 102 n (%)	After n = 99 n (%)	Chi-square p-value
Preterm labour occurs before			
40 weeks g.a.	37 (36)	14 (14)	0.003
37 weeks g.a.†	46 (45)	63 (64)	
28 weeks g.a.	5 (5)	8 (8)	
Unsure	14 (14)	14 (14)	
Knowledge of			
4 or more symptoms	12 (12)	30 (30)	<0.001
Less than 4 symptoms	90 (88)	69 (70)	
Response to symptoms of preterm labour			
Present to hospital†	28 (28)	42 (44)	0.024
Other response	71 (72)	54 (56)	

† Optimal response

TABLE III
Administration of Drugs Before and After Program Implementation

Administration of Drugs	Before n = 38 n (%)	After n = 40 n (%)	Chi-square p-value
Gestational Age < 37 Weeks			
Tocolytics			
Yes†	2 (5)	5 (13)	0.264
No	36 (95)	35 (87)	
Corticosteroids			
No Dose	30 (79)	30 (75)	0.401
One Dose	1 (3)	4 (10)	
Two Doses†	6 (18)	6 (15)	
Gestational Age < 34 Weeks	n = 18 n (%)	n = 16 n (%)	
Tocolytics			
Yes†	1 (6)	3 (19)	0.595
No	17 (94)	13 (81)	
Corticosteroids			
No Dose	10 (56)	10 (62)	0.323
One Dose	1 (6)	2 (13)	
Two Doses†	7 (38)	4 (25)	

† Correct response

istration of tocolytic and corticosteroid drugs) components of the program. The

failure of either of these components impedes a change in the outcome. This

may be a reflection of a variety of factors including a lack of confidence in tocolytic drugs (given the controversy surrounding their use^{11,12}). Indeed, until clinically effective tocolytics are available, community-wide preterm birth prevention programs will be ineffective in lengthening gestation. However, this study shows that when such an intervention is identified, a community-wide preterm birth prevention program such as described in this paper will be useful in educating caregivers and women about the need for early identification.

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