

Pilot Study on Pediatrics Obesity Prevention by Maternal Smoking Cessation in Pregnancy and Lactation (Phase 1)

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Abstract (Phase 1)

Objective

We aimed to develop an effective intervention program on maternal smoking cessation during pregnancy.

Methods

In this single-case experiment with multiple baselines, 13 daily smokers in early pregnancy were recruited from Buffalo, NY in 2015. Participants had 1 (early intervention group), 3 (delayed intervention group) or 5 (late intervention group) repeated baseline visits, and then received the same intervention with 4 components: stage-tailored education and counseling, monitoring and feedback, contingent financial incentives along with financial planning, and family support.

Results

Consistent smoking trajectories were observed across the 3 groups: none stopped smoking before intervention regardless of waiting duration, most patients started to quit smoking (verified by urine-cotinine) after intervention. Assuming drop-outs as smoking, conservative estimation of smoking cessation rate was 84.6% at 2 weeks of intervention, 76.9% at 8 weeks of intervention, and 70.0% by the end of pregnancy (35+ weeks).

Conclusion

Our multicomponent intervention could achieve high rate (70% or higher) of smoking cessation during pregnancy.

Background and Significance

Prenatal and postnatal tobacco exposure predicts childhood obesity

Maternal smoking is associated with rapid infant weight gain

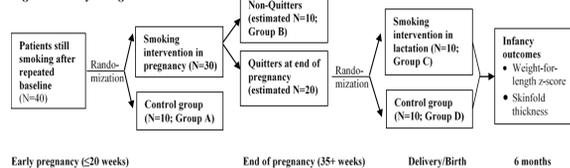
Childhood obesity may be prevented by maternal smoking cessation



Objective

- Specific Aim 1:** to examine the effect of maternal smoking cessation intervention in pregnancy on infant gain in WFL z-score from birth to 6 months (**Phase 1**).
 - This poster presents the preliminary results on maternal smoking cessation in pregnancy and birth outcomes.
- Specific Aim 2:** to examine the effect of maternal smoking abstinence intervention in lactation on infant post-weaning gain in WFL z-score among the women who successfully quit smoking in pregnancy (**Phase 2**).

Figure 1. Study Design



Methods

Single-case experiment design with multiple baselines (Phase 1)

- Early intervention group (N=4): 3 visits before intervention
- Delayed intervention group (N=4): 5 visits before intervention
- Late intervention group (N=5): 7 visits before intervention

Sample Flow

- 68 patients from 3 local sites in Buffalo, NY
- 36 patients completed survey screening
- 27 patients completed lab screening
- 22 patients met study criteria
- 13 patients managed to complete pre-test and repeated baseline and then received intervention

Number of Visits

- 506 patient visits completed by 2/22/2016
 - 485 prenatal lab visits
 - 7 postpartum hospital visits
 - 14 postpartum home visits
- 39 training sessions for 8 family supporters completed

Duration

- Longest duration of participation is 236 days
- Furthest follow-up is 2 months postpartum

Intervention Schedule

Table 1. Schedule of intervention visits

Week	From initial intervention to quit date	Quit Date	Post Quit Date				Delivery	Postpartum	
			Weeks 1-2	Weeks 3-8	Weeks 9-12	Week 13 - delivery		Weeks 1-4	Weeks 5-24
Frequency	Twice/week	-	Daily	Twice/week	Weekly	Biweekly	-	Weekly	Biweekly
Day	Mon, Thu	-	Mon-Fri	Mon, Thu	Wed	Wed	-	Wed	Wed
Total #	1-4	-	10	14	4	Varying	-	4	10

Multicomponent Intervention on Smoking Cessation in Pregnancy



Education and Counseling



Monitoring and Feedback



Contingent Financial Incentives



Family Support

Outcomes

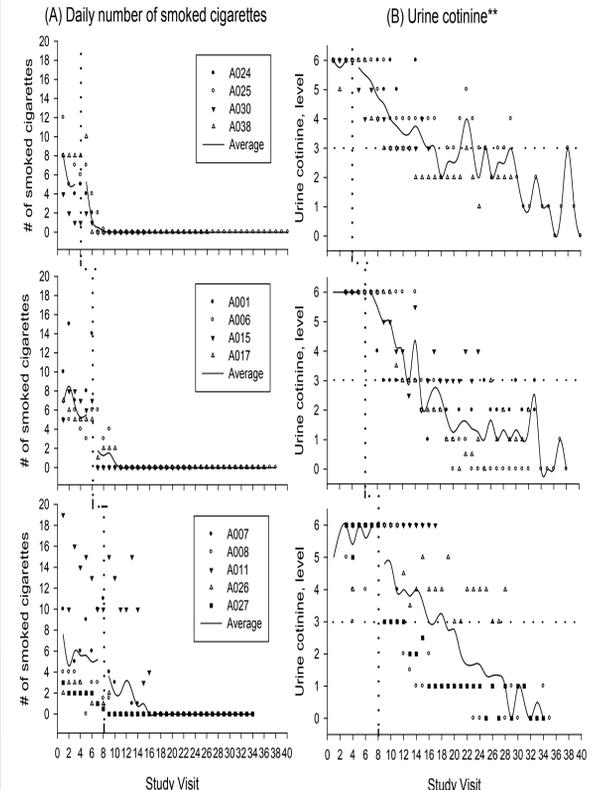
- Recorded daily number of smoked cigarettes
- Exhaled breath carbon monoxide (CO)
- Urine-cotinine level



Results

- Consistent smoking trajectories across the 3 groups: none stopped smoking before intervention regardless of waiting duration, most patients started to quit smoking (verified by urine-cotinine) after intervention (**Figure 2**).
- Assuming drop-outs as smoking, conservative estimation of smoking cessation rate was 84.6% at 2 weeks of intervention, 76.9% at 8 weeks of intervention, and 70.0% by the end of pregnancy (35+ weeks).
- On average, infants of mothers who quit smoking in early pregnancy were 779.5 grams heavier at birth (3,416.0 grams [SD, 522.6]) than those infants of mother who continued smoking throughout pregnancy (2,636.5 grams [241.1]). The mean difference was statistically significant (p=0.023) even with such small sample size (N=8). They also had an average 3.6 cm longer birth length, and the difference was marginally significantly (p=0.058). Gestational age was similar between two groups of infants

Figure 2. Cigarette smoking and urine cotinine trajectories in our pilot study on maternal smoking cessation in pregnancy with multiple-baseline in Buffalo, NY*



* Vertical dash line for initial intervention visit; Top panel - early intervention group with 3 pre-intervention visits; Middle panel - delayed intervention group with 5 pre-intervention visits; Bottom panel - late intervention group with 7 pre-intervention visits.
** Cut-off point for urine cotinine level: level 0, no tobacco exposure; level 1-2, light or moderate secondhand smoke exposure; level 3-4, heavy secondhand smoke exposure or light smoking; level 5-6, moderate or heavy smoking.

Table 2. The Beneficial Effect of Smoking Cessation in Pregnancy on Birth Outcomes

	Quitters (N=6)		Continuous smokers (N=2)		Mean difference	P-value
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
Gestational age, day	273.7 (14.1)	268.5 (2.1)	268.5 (2.1)	268.5 (2.1)	5.2	0.210
Birth weight, gram	3,416.0 (522.6)	2,636.5 (241.1)	2,636.5 (241.1)	2,636.5 (241.1)	779.5	0.023
Birth length, cm	50.4 (4.0)	46.7 (1.4)	46.7 (1.4)	46.7 (1.4)	3.6	0.058

SD, standard deviation. * t-test.

Conclusion

- Our intervention could achieve high smoking cessation rate during pregnancy.
- Maternal smoking cessation in early pregnancy could significantly improve birth weight and possibly birth length.

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