Biomarker feedback intervention for smoking cessation among pregnant Alaska Native women

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Introduction

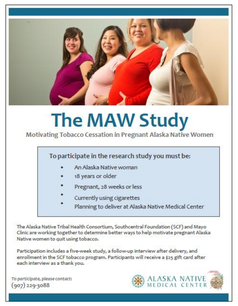
This study was developed with direction from tobacco using, pregnant Alaska Native (AN) women who suggested specific information about fetal exposure to tobacco could influence cessation.

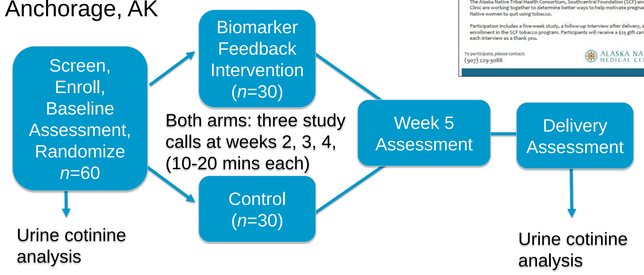
- AN women are three times more likely to smoke cigarettes in pregnancy compared to White women (27.3% vs 8.7%) and other ethnic groups (7.0%) in Alaska (AK)[1]
- Risks of smoking in pregnancy to fetus and child include:[2,3]
  - Low birth weight
  - Pre-term birth
  - Fetal death
  - Exposure to carcinogens
  - Sudden infant death syndrome
  - Increased risk of tobacco dependence
- Some evidence for biomarker feedback when combined with cessation counseling for reducing smoking in pregnancy[4]
- Evaluated feasibility and potential efficacy of social cognitive theory-based intervention with novel use of fetal NNAL* exposure as biomarker feedback for smoking cessation among pregnant AN women

*NNAL, 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol, is more stable metabolite of tobacco carcinogen 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK)

Methods

- Randomized pilot study, with 60 pregnant AN women
- Participants recruited from prenatal clinics in Tribal primary care center in Anchorage, AK





- All participants received standard of care cessation counseling based on 5A's through three study calls
  - Intervention arm also received personalized biomarker information
- Biomarker feedback involved testing woman's urine cotinine (metabolite of nicotine) level and using informational brochure to demonstrate how her cotinine level correlated to her infant's likely exposure to tobacco specific carcinogen, NNAL
  - Correlation established in previous phase of study[5]

Results

Baseline Characteristic	Intervention (*n*=30)	Control (*n*=29)
Age (mean ± SD)	26.1 ± 5.0	27.8 ± 4.9
Married/partner	17%	41%*
Spouse/partner smokes	80%	83%
Weeks gestation (mean ± SD)	14.3 ± 6.1	15.2 ± 7.1
≥1 biological children	83%	79%
Readiness to quit score (mean ± SD) Low (0-3) Medium (4-6) High (7-10)	7.4 ± 1.5 0% 23% 77%	6.9 ± 2.0 0% 48% 52%
Cigarettes per day (mean ± SD)	4.6 ± 2.9	4.9 ± 3.0

*p<0.05

- For both arms, 80% of participants completed all three study calls and week 5 assessment, and delivery assessment completed by 77%
- Treatment acceptability high with 87% of intervention and 71% of control indicating they would definitely recommend program to another pregnant woman (p=0.29)
- 62% of intervention and 79% of controls reported program was very helpful (p=0.20)

Outcome	Week 5		Delivery	
	Interv.	Control	Interv.	Control
Self-report 7-day abstinence				
Per-protocol	17%	26%	26%	30%
Intention to treat	13%	23%	20%	23%
Biochemically verified abstinence				
Per-protocol	--	--	26%	26%
Intention to treat	--	--	20%	20%
Quit attempt since enrollment				
Per-protocol	61%	83%	65%	83%
Intention to treat	60%	63%	63%	67%

- Per-protocol analysis includes only those participants who followed protocol they were assigned to
- Intention to treat analysis includes all participants according to arm they were assigned to

Conclusions

- Although study supports feasibility and acceptability of providing biomarker feedback within a clinical care delivery system, biomarker feedback did not improve smoking cessation during treatment compared to usual care
- Possible reason for high abstinence rate in control arm is that it may have been more intensive than most "usual care" comparisons that only provide information on risks of smoking in pregnancy and brief advice to quit[5]
- Improved cessation rates could have been a consequence of programmatic changes influenced by study which included more active outreach to pregnant women who smoked and placement of cessation counselor in accessible location in clinic
  - Biomarker feedback may not be necessary if proactive outreach and resources can be easily accessed
- Further investigation needed to:
  - Assess alternative messaging appeals and delivery channels for communicating risk information on fetal NNAL exposure
  - Evaluate use of newborn's exposure to NNAL as an approach for demonstrating secondhand smoke exposure and preventing relapse postpartum
  - Follow-up with participants to investigate risk factors for resumption of smoking and resiliency factors for those who sustained abstinence

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