

**Personal oral infection control, low birthweight and preterm births in Appalachia West Virginia: A cross-sectional study**R. Constance Wiener and Christopher Waters  
West Virginia University**Objective**

The objective of this study was to determine if the use of a power toothbrush (comparing pregnant women who use a power toothbrush 13 or more times per week and pregnant women who use a power toothbrush less than 13 times per week) was associated with the pregnancy outcomes of birthweight (2500 g and above vs less than 2500 g) and preterm birth (defined as less than 37 weeks of gestation).

**Materials and Methods**

The data for this study were from the West Virginia Healthy Start Helping Appalachian Parents and Infants (HAPI) project from 2005 to 2016, a program funded by the Health Resources and Services Administration. This particular study is a secondary data analysis of HAPI data collected from 2005 to 2016. The criteria for inclusion into this study were that the women were participants in the HAPI project (that is, West Virginia residency, Medicaid, or Office of Maternal, Child, and Family Health coverage, and pregnancy), completed the oral health education portion of the HAPI program, completed the first dental visit (examination, periodontal screening and reporting score [PSR], and prophylaxis), received a power toothbrush, delivered a singleton baby, and completed the second dental visit (examination, PSR, and prophylaxis). Toothbrushing frequency (personal oral infection control) was by self-report.

The study was acknowledged as non-human subject research (secondary data analysis) by the West Virginia University Institutional Review Board.

**Results**

Of the 3,930 HAPI participants from 2005 to 2016, there were 3,737 participants who received at least one oral health education session relating to oral hygiene during pregnancy. The designated care coordinators arranged oral examinations and prophylaxis for the interested women. There were 2,282 participants who attended at least the initial oral examination visit with a licensed dentist working

with HAPI. After the HAPI participant delivered her baby, she was invited to return to her dentist for a follow-up visit where a second examination, with PSR, and prophylaxis were completed. There were 891 (39.0%) who completed the second PSR. 845 women with singleton births (46 women, 5.2% had twins) with full data were included in this secondary analysis.

**Toothbrushing frequency**

During pregnancy, there were 19 (2.2%) women who reported no personal oral infection control. Sixty-five women reported personal oral infection control 1-5 times per week. There were 222 who reported personal oral infection control 6-12 times per week, and 539 reported personal oral infection control 13 or more times per week. (Table 1).

**Pregnancy outcome**

There was a significant difference between mothers whose personal oral infection control was less frequent than 13 times per week and mothers whose personal oral infection control was 13 or more times per week in terms of preterm births ( $P=0.024$ ) and of having a baby with low birthweight ( $P=0.008$ ), as analyzed with Fisher's Exact test (Table 2).

**Low birthweight outcome**

In unadjusted logistic regression on low birthweight, mothers whose personal oral infection control was less than 13 times per week had an odds ratio of 2.07 (95% Confidence Interval [CI]: 1.18, 3.62;  $P=0.011$ ) as compared with mothers whose personal oral infection control was 13 or more times per week. In adjusted regression, the odds ratio was 1.82 (95% CI: 0.96, 3.47;  $P=0.068$ ) (Table 3).

**Gestational age outcome**

In unadjusted logistic regression on preterm birth, mothers whose personal oral infection control was less than 13 times per week had an odds ratio of 1.78 (95% CI: 1.04, 3.02;  $P=0.034$ ) as compared with mothers whose personal oral infection control was 13 or more times per week. In adjusted regression, the odds ratio was 1.31 (95% CI: 0.70, 2.43;  $P=0.403$ ) (Table 4).

**Table 1. Mother's Daily Oral Infection Control/Week**

None	19 (2.2%)
1-5 times/week	65 (7.7%)
6-12 times/week	222 (26.3%)
13 or more times/week	539 (63.8%)

**Table 2. Low birthweight<sup>a</sup> and preterm<sup>b</sup> birth by personal oral infection control/week**

Personal Oral Infection Control			
	< 13 times per week	≥ 13 times per week	P-value <sup>c</sup>
Preterm			
Yes	29	30	0.024
No	277	509	
Low birthweight			
Yes	28	25	0.008
No	278	514	

<sup>a</sup> Low birthweight, defined as less than 2500 grams.

<sup>b</sup> Preterm, defined as less than 37 weeks gestation.

<sup>c</sup> Fisher's Exact P-value (1 sided)

**Table 3. Logistic regressions on low birthweight vs daily oral infection control**

	Unadjusted Odds Ratio [95% CI]	P-value	Adjusted Odds Ratio* [95% CI]	P-value
Frequency				
< 13 times/week	2.07 [1.18, 3.62]	0.011	1.82 [0.96, 3.47]	0.068
≥ 13 times/week	reference (1.00)		reference (1.00)	

\* = Adjusted for preterm birth and the additive PSR score of the sextants

**Table 4. Logistic regressions on preterm birth vs daily oral infection control**

	Unadjusted Odds Ratio [95% CI]	P-value	Adjusted Odds Ratio* [95% CI]	P-value
Frequency				
< 13 times/week	1.78 [1.04, 3.02]	0.034	1.31 [0.70, 2.43]	0.403
≥ 13 times/week	reference (1.00)		reference (1.00)	

\* = Adjusted for low birthweight and the additive PSR score of the sextants

## Conclusions

In this study of personal oral infection control and pregnancy outcomes of women in Appalachia West Virginia, women who maintained personal oral infection control with a power toothbrush at levels of 13 or more times per week were more likely to deliver at term and to have babies of normal weight than women who did not use the power toothbrushes at 13 or more times per week in the unadjusted analyses. The association was significant in the bivariate analyses and in unadjusted logistic regression. The association remained positive but was no longer statistically significant with the addition of other factors in adjusted logistic regression.

