



Adolescents' sense of coherence and smoking predicts self-reported gingivitis

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INTRODUCTION

- Experiencing 'bleeding gums' when brushing one's teeth is the most common symptom of gingivitis or inflammation of the gums (Figure 1).
- Bacterial plaque is the principal aetiological factor for gingivitis, but several other local and systemic factors have a modifying role in its pathogenesis.¹
- A dose-dependent suppressive effect of smoking on gingival bleeding or gingivitis have been noted among adults in several cross-sectional studies,^{2,3} but a more recent longitudinal study using a more appropriate modeling method (GEE) for repeated measures demonstrated an increased risk among smokers.⁴
- Considering that stress and coping have been associated with both gingivitis and smoking behaviour among young adults, ability to cope with stress as measured on a sense of coherence (SOC) scale⁵ may confound the effect of smoking on gingival health.

OBJECTIVE

- Given that most of the existing studies have been done in developed countries and among adults with higher smoking intensity, this study sought to determine the independent influence of SOC and smoking on the self-reported gingival health of a cohort of rural black South African adolescents.

METHODS

- An 18-month longitudinal study involving three waves of survey (April 2005 – October 2006) of a representative sample of 8th-graders who self-identified as black Africans (n=970) from 11 randomly selected high schools in the Limpopo province.
- Data collected through a self-administered questionnaire and oral examination included socio-demographic profile of the respondents, self-reported frequent gingival bleeding, tobacco use status, SOC levels, past dental visit, tooth-brushing frequency and clinical plaque levels at baseline (T1). The same questionnaire was then used to obtain similar information on gingival bleeding after 12 months (T2) and 18 months (T3).
- SOC (stress-coping ability) was measured using a 6-item Antonovsky's SOC scale ($\alpha=0.63$). Higher SOC score indicating better ability to cope with stress.
- Adjusting for cluster sample design used, data analysis included chi-square statistics, t-tests and fitting a multivariate generalized estimating equation (GEE) model using a stepwise approach.

RESULTS

- Of the participants, 87.1% provided at least one follow-up data. The mean age of the adolescents at baseline was 14.4 years and 7% were habitual or regular smokers (Table 1).
- Among our sample, 74.6% reported experiencing gingivitis at some point during follow-up, while 41.9% reported frequent gingival bleeding at the last survey.
- After controlling for the SOC level, the influence of the baseline plaque score on self-reported gingivitis reached statistical significance (suppressor effect), while the influence of smoking became slightly attenuated, but remained significant (partial moderating effect) (Table 2).

Table 1 Study sample characteristics and attrition/drop-out analysis

Baseline characteristics	Participants followed up on % (n/total)	Drop-outs % (n/125)	p-value
Lives in informal housing structure	13.1% (n=106)	16.4% (n=13)	0.37
Poor household income (<R150)	71.7% (n=599)	68.5% (n=62)	0.72
Female	52.8% (n=445)	52.4% (n=65)	0.83
Late adolescence (15-19 years)	41.2% (n=344)	44.3% (n=4)	0.57
Ever visited a dentist before	20.9% (n=17)	20.2% (n=25)	0.57
Brushes at least twice daily	28.8% (n=235)	28.5% (n=25)	0.79
Daily/regular smoker	7.6% (n=6)	5.6% (n=7)	0.70
Recent frequent gum bleeding	37.4% (n=311)	35.6% (n=44)	0.88
	Mean (SD)		
Total SOC-6 score (range 0-42)	26.3 (7.2)	25.3 (7.3)	0.17
Age (range 12-19 years)	14.4 (1.5)	14.7 (1.5)	0.36
Mean Plaque score (range 0-5)	2.04 (2.73)	2.01 (2.00)	0.82

Note: Total (n) may be lower than expected because of missing data.

Table 2 Factors associated with self-reporting of recent frequent bleeding gums

Characteristic	Univariate OR		p-value	Multivariate OR		p-value
	OR	95% CI		OR	95% CI	
Time						
Bleeding vs 12 months vs 18 months	1.52 (1.24 - 1.86)	<0.001	1.40 (1.18 - 1.65)	<0.001	1.40 (1.17 - 1.63)	<0.001
Poor household resident Yes vs No	1.58 (1.38 - 2.02)	<0.001	1.60 (1.17 - 2.20)	<0.001		
Gender						
Female vs male	0.79 (0.64 - 0.98)	0.03	0.76 (0.61 - 0.95)	0.02		
Brushes at least twice daily Yes vs No	0.79 (0.61 - 0.99)	0.04	0.79 (0.62 - 1.00)	0.06		
Plaque score (per unit change)	1.15 (0.99 - 1.34)	0.08	1.16 (0.91 - 1.39)	0.04		
Regular smoker Yes vs No	1.76 (1.16 - 2.67)	0.01	1.57 (1.02 - 2.39)	0.04		
SOC total score (per unit change)	0.96 (0.92 - 0.99)	<0.001	0.96 (0.92 - 0.99)	<0.001		

SD: Standard deviation; OR: Odds Ratio; CI: Confidence Interval; 95%: 95% Confidence Interval; OR: Odds Ratio; CI: Confidence Interval. *p < 0.05; **p < 0.01; ***p < 0.001.

DISCUSSION

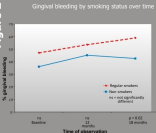
- This study is the first to examine the longitudinal course of self-reported gingival health among South African adolescents and its association with SOC.
- Our findings are consistent with that of similar studies conducted among adults and elsewhere, except that unlike most previous studies smoking significantly increased the risk for bleeding gums, irrespective of SOC levels and plaque control.
- A major limitation of this study is the use of self-report. However, intra- and inter-examiner variations in 'bleeding on probing' measurements are in themselves potential sources of measurement error and self-report would in any case be a more proximal determinant of dental service demand.

Figure 1



"Bleeding gums" or gingivitis

Figure 2



CONCLUSION

- Adolescent smoking and SOC levels are independent predictors of self-reported gingivitis. Therefore, in addition to plaque control, smoking prevention and the teaching of stress-coping skills may be important interventions for promoting adolescents' gingival health.

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