Oral Health Concerns and Connections to Mental Health among Rhode Island High School Students, 2017

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BACKGROUND

In the United States, mental illness and behavioral issues are among the largest sources of health care costs and significantly compromise youth and family well-being. In 2015 mental health and substance use disorders were the leading cause of disease burden, surpassing cancer and cardiovascular disease.[1] The overall age-adjusted suicide rate in the U.S. was 24% higher in 2014 than in 1999.[2] The U.S. also faces challenges pertaining to young people's oral health. In 2015–16, more than half (53.5%) of 12–19-year-olds had experienced tooth decay, and 13.4% had untreated decay.[3]

Both mental and oral health issues also are common in Rhode Island; among Rhode Islanders ages 10–24, suicide was the second leading cause of death in 2016.[4] Dental disease is also prevalent among RI teens, especially those from low-income backgrounds. Almost 30% of teens with Medicaid-covered dental visits in 2017 required a filling to address a dental issue.[5]

We present data for RI public high school (PHS) students on self-reported oral health concerns and describe potential connections to self-reported mental health status.

METHODOLOGY

The Youth Risk Behavior Survey (YRBS) is a biennial national survey of PHS students, developed by the Centers for Disease Control and Prevention (CDC) to monitor self-reported health behaviors and risk. A two-stage, cluster sample design obtains estimates representative of the state population.[6] Schools are selected with probability proportional to enrollment size and then classes within are randomly selected. A weight is applied to each respondent to adjust for student nonresponse and to obtain a distribution of students by grade, sex, and race/ethnicity that approximates the state PHS population. In total 2,221 students from 19 PHSs completed the YRBS, representative of 41,114 students statewide.

We focus on the following oral and mental health items:

"During the past 12 months….

- "How often were you self-conscious or embarrassed because of your teeth or mouth? (Never, rarely, sometimes, most of the time, always)"
- "Did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?"
- "Did you ever seriously consider attempting suicide?"
- "Did you make a plan about how you would attempt suicide?"
- "How many times did you actually attempt suicide?"

We present univariate descriptive statistics for oral and mental health items of interest. Chi-square tests were used to examine differences in feeling embarrassed by teeth (sometimes/most of the time/always vs. rarely/never) across demographic groups. Responses to the item: "In the last 30 days, how often did you go hungry because there was not enough food in your home", was used as a proxy for socioeconomic status (SES), with those answering sometimes/most of the time/always categorized as lower-SES and those responding rarely/never as higher-SES. Next, chi-square tests were conducted to evaluate the association between oral and mental health. For this analysis, we constructed a three-level variable for oral health (never/rarely, sometimes, or most of the time/always embarrassed by teeth). Logistic regressions were estimated to test the effect of oral health on mental health, controlling for sex, grade, SES, and race/ethnicity.

RESULTS

Overall, 21.1% of PHS students reported feeling self-conscious or embarrassed because of their teeth or mouth at least sometimes in the past 12 months. Specifically, 14.3% reported sometimes feeling self-conscious or embarrassed, 3.5% most of the time, and 3.1% always felt self-conscious or embarrassed. Female and lower-SES students were more likely than male and higher-SES students, respectively, to report being embarrassed by their teeth (**Table 1**).

Analysis of mental health items revealed 29.4% of students felt sad or hopeless, 15.9% seriously considered attempting suicide, 13.6% made a plan about how they would attempt suicide, and 10.5% attempted suicide in the last year. Due to the strong association of gender and SES regarding feelings about oral health, we also explored the association between these items and mental health (**Figures 1, 2**). Chi-square tests showed that females are significantly more likely than males to report negative perceptions of both

Table 1. Self-reported embarrassment by teeth/mouth among RI public high school students, by selected demographics

	Sometimes/Most of the time/Always embarrassed by teeth (N=8,337)		Rarely/Never embarrassed by teeth (N=31,177)		Total RI high school population (N=41,114)
	Weighted n	Weighted %	Weighted n	Weighted %	
SEX*					
Female	5,150	26.9%	14,003	73.1%	19,699
Male	3,017	15.1%	16,979	84.9%	20,953
RACE/ETHNICITY					
White	4,772	19.8%	19,380	80.2%	24,678
Black	699	22.4%	2,417	77.6%	3,384
Hispanic	2,016	22.7%	6,871	77.3%	9,327
Other	681	26.6%	1,884	73.4%	2,753
SCHOOL GRADE					
9th	2,418	23.1%	8,070	76.9%	11,155
10th	2,063	20.2%	8,153	79.8%	10,570
11th	1,793	19.1%	7,612	80.9%	9,628
12th	1,955	21.7%	7,055	78.3%	9,302
WENT HUNGRY (SES) [a]*					
Sometimes/Most of the time/Always (Low SES)	2,367	38.4%	3,796	61.6%	6,259
Rarely/Never (High SES)	5,850	17.8%	27,033	82.2%	33,412

[a] Responses to item: "During the past 30 days, how often did you go hungry because there was not enough food in your home" was used as proxy for SES.

*$p < .05$, significant difference between groups

Note: numbers may not add up to column header due to missing data on some demographics.

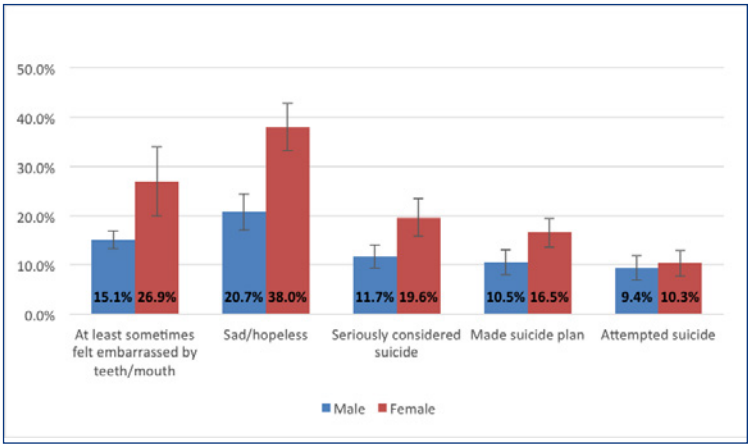
Source: Youth Risk Behavior Survey, 2017

their oral and mental health (except attempting suicide). Those of lower SES were significanty more likely than those of high SES to report all poor oral health and mental health outcomes.

The cross-sectional analysis revealed that a negative sense of one's teeth is significantly associated with feeling sad or hopeless and having suicidal thoughts or actions among RI PHS students. The proportion of students who felt sad or hopeless was more than twice as high among students who reported most of the time/always feeling embarrassed because of their teeth versus those who never/rarely felt embarrassed (60.1% vs. 24.8%, **Figure 3**). Those who reported embarrassment from their teeth were also more likely than those who did not report embarrassment to have had suicidal thoughts and made suicide attempts in the past year.

Results of multivariable logistic regression analyses indicated students who reported at least sometimes feeling embarrassment from their teeth had twice the odds of reporting all poor mental health outcomes compared to those who did not report embarrassment, after controlling for sex, race/ethnicity, SES, and grade (**Table 2**).

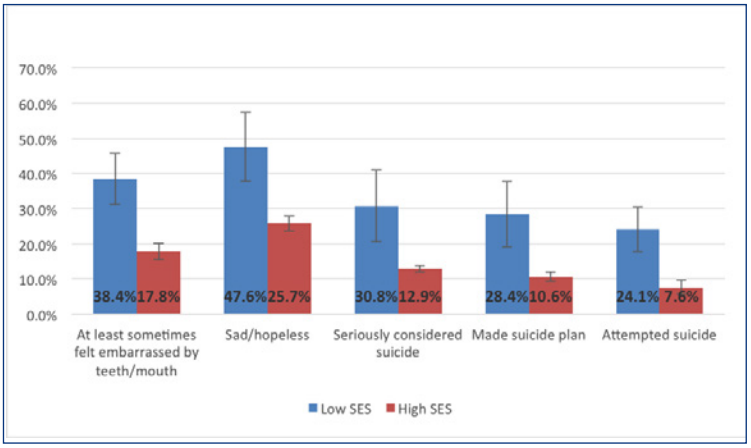
Figure 1. Perceptions of oral health and mental health status, by sex



Data source: Youth Risk Behavior Survey, 2017.

Note: Error bars denote 95% confidence intervals. All differences except attempted suicide were statistically significant, $p < .05$

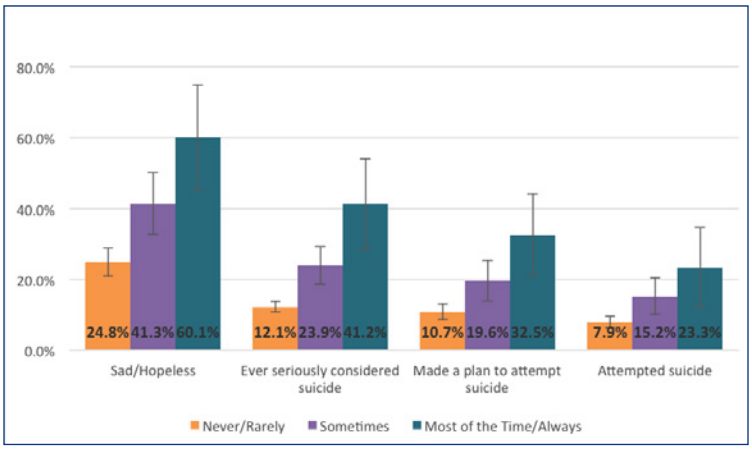
Figure 2. Perceptions of oral health and mental health status, by SES



Data source: Youth Risk Behavior Survey, 2017.

Note: Error bars denote 95% confidence intervals. All differences were statistically significant, $p < .05$

Figure 3. Mental health among RI PHS students, by oral health confidence



Data source: Youth Risk Behavior Survey, 2017. All differences were statistically significant, $p < .05$

Table 2. Adjusted logistic regression – association between embarrassment from teeth and mental health outcomes

Oral Health	Mental Health Outcome	Adjusted Odds Ratio* (95% CL)
Feeling embarrassed by teeth/mouth	Feeling sad/hopeless	2.09 (1.41–3.09)
	Considered suicide	2.31 (1.83–2.92)
	Made suicide plan	1.93 (1.46–2.54)
	Attempted suicide	1.98 (1.47–2.66)

Note: Displays the odds of reporting poor mental health outcome among those who reported at least sometimes feeling embarrassment from their teeth/mouth compared to those who did not report embarrassment from teeth/mouth adjusting for gender, grade, SES, and race/ethnicity.

DISCUSSION

Approximately one in five RI students reported they felt self-conscious or embarrassed about their teeth/mouth "sometimes" or more frequently in the past year. Being self-conscious of one's teeth/mouth was significantly associated with feelings of sadness/hopelessness and reported suicidal thoughts and attempts. The data observed among RI PHS students aligns with findings from prior studies. For example, a 2014 cross-sectional study of adults found greater anxiety and depression among those with lower levels of satisfaction with their orofacial appearance.[7] While results show an association between oral and mental health concerns, the cross-sectional data preclude us from ascertaining causation. It is possible poor mental health affects perceptions of oral health, or that the two are associated due to unmeasured confounders such as family income level.

YRBS data are self-reported and may be susceptible to under- or overreporting. The oral health item used in this analysis measured individual's feelings about their teeth and was not an objective measure of overall oral health. Prior analysis shows individuals' perceptions of the acceptability of their dental appearance may not be in accordance with the actual degree of malocclusion or tooth position deviation.[8] We could not measure the severity of dental problems among students in our sample but did find a positive association between embarrassment from one's teeth and self-reported oral pain/soreness. Additionally, the reported levels of oral health self-consciousness or embarrassment may be inflated due to many HS students receiving orthodontic treatment. In the U.S., among all children 0–20 years old, 15.1% had a dental visit associated with orthodontics in 2013 with significant variation associated with race/ethnicity, poverty status, and insurance coverage.[9] Additional analysis of our data found a positive association between being embarrassed by one's teeth and having visited a dentist in the last year.

Despite potential caveats and confounders, the data points to a need for interprofessional collaboration. Oral health providers should consider the mental health of their patients as a factor in their care, as the association between poor mental and oral health has been documented.[10] Mental health clinicians should verify that teens have a dental home, where preventive care is more likely to happen and referrals to specialty care can occur. Training oral health providers in basic mental health awareness, especially among vulnerable youth, may help them recognize mental distress in their patients. Using evidence-based training programs to teach individuals to recognize those suffering mental distress and refer them to help has shown effectiveness in the general population[11] and should be effective for oral health providers as well. We recommend further research into connections between oral and mental health and the mechanisms that drive these connections to develop the most effective interventions designed to improve one or both health indicators.

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Disclosures

The authors have no financial disclosures to report.

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