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## **Suicide Ideation and Attempt in Adolescent Vermonters as Related to Perceived Family Socioeconomic Status and Community Sense of Belonging**

Lila Sullivan

Insu Koh

Issy Magbie

Jenna Beckwith

Gabe Mason

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## **INTRODUCTION**

Suicide is the third highest cause of death in the United States among adolescents aged 15-19.<sup>1</sup> Previous mental health disorders, being female, and family history have an impact on the rates of suicide ideation.<sup>2</sup> External factors such as the relationship between perceived family socioeconomic status (SES) and community sense of belonging, are related to suicide ideation and attempt.<sup>3,4,5</sup>

A Vermont study of self-harm rates in Vermont youth and their associated suicide rates in younger populations age 15-24 years old revealed that poor mental health impacts suicide risk.<sup>6</sup> For the last 10 years, Vermont has had a consistently higher rate of suicide than the national average.<sup>7</sup> We sought to understand the relationship between socioeconomic status and community sense of belonging, and suicide in Vermont.

The Vermont Youth Risk Behavior Survey (YRBS) is a tool for monitoring health related behaviors which can be used to explore new relationships pertaining to public health.<sup>8</sup> In this study we used YRBS data to examine whether suicide ideation and attempt in high school aged youth are associated with perceived family socioeconomic status and community sense of belonging when controlling for demographic variables and if these associations differ by gender, race, age, and transgender status.

## **METHODS**

YRBS data was used to assess the relationship between exposure variables and two outcomes: 1) suicide ideation (“During the past 12 months, did you make a plan about how you would attempt suicide?”) and 2) suicide attempts (“During the past 12 months, how many times did you actually attempt suicide?”) These variables were coded as Yes/No.

The exposure variables were self-perceived family socioeconomic status and community sense of belonging. Family SES was generated using the survey of “subjective family social status”, answers were grouped into three categories: better than others, middle, and worse than others. Community sense of belonging was generated using the question “Do you agree or disagree that

in your community you feel like you matter to people?” We grouped answers into agree, not sure, and disagree.

Age (15 and under, 16 and older), sex (female, male), race (white, non-white), and transgender status were demographic covariates. For transgender status we dichotomized the answers into no or other answers.

Analyses used R software package. We excluded surveys in which questions regarding suicide behavior, perceived family SES, community sense of belonging, and demographics were unanswered. We applied the  $\chi^2$  to identify significant relationships between independent and dependent variables. We used multiple logistic regression models to calculate adjusted odds ratios (ORs) and 95% confidence intervals (CIs). Interaction between individual demographic covariates and outcomes was investigated to identify an effect moderator. We stratified the analysis if a demographic covariate was an effect moderator.

According to the policy defining activities which constitute research at the University of Vermont/University of Vermont Health Network, this work met criteria for operational improvement activities exempt from IRB review.

## **RESULTS**

Of 18,613 surveys completed for the 2019 VT-YRBS, we excluded 1,534 incomplete surveys, which resulted in a final sample of 16,999 survey responses.

### **Demographic characteristics by suicidal behaviors**

Among 16,999 students, 2,319 (13.6%) students responded that they planned how they would attempt suicide in the past 12 months. 1,095 (6.4%) students responded they attempted suicide at least once in the past 12 months. Table 1 shows demographic characteristics of suicidal behaviors.

All demographic covariates, except for age, were significantly associated with suicide ideation. Students who were female, or non-white, or transgender were more likely to report suicide

ideation (Table 1). For suicide attempt, a similar association is found. Age was also significantly associated with a higher likelihood to attempt suicide (46.5% young vs. 53.5% old, Table 1).

Table 1. Demographic and predictor characteristics by suicidal behaviors

|                             | Suicide ideation |                 |          | Suicidal attempt |                 |          |
|-----------------------------|------------------|-----------------|----------|------------------|-----------------|----------|
|                             | No<br>(N=14680)  | Yes<br>(N=2319) | <i>P</i> | No<br>(N=15904)  | Yes<br>(N=1095) | <i>P</i> |
| <b>Age</b>                  |                  |                 |          |                  |                 |          |
| young (<=15y)               | 6040 (41.1%)     | 983 (42.4%)     | .268     | 6514 (41.0%)     | 509 (46.5%)     | <.001    |
| old (>=16y)                 | 8640 (58.9%)     | 1336 (57.6%)    |          | 9390 (59.0%)     | 586 (53.5%)     |          |
| <b>Sex</b>                  |                  |                 |          |                  |                 |          |
| Male                        | 7568 (51.6%)     | 876 (37.8%)     | <.001    | 8056 (50.7%)     | 388 (35.4%)     | <.001    |
| Female                      | 7112 (48.4%)     | 1443 (62.2%)    |          | 7848 (49.3%)     | 707 (64.6%)     |          |
| <b>Race</b>                 |                  |                 |          |                  |                 |          |
| White                       | 12757 (86.9%)    | 1914 (82.5%)    | <.001    | 13809 (86.8%)    | 862 (78.7%)     | <.001    |
| non-white                   | 1923 (13.1%)     | 405 (17.5%)     |          | 2095 (13.2%)     | 233 (21.3%)     |          |
| <b>Transgender</b>          |                  |                 |          |                  |                 |          |
| No                          | 14251 (97.1%)    | 2096 (90.4%)    | <.001    | 15395 (96.8%)    | 952 (86.9%)     | <.001    |
| other answers               | 429 (2.9%)       | 223 (9.6%)      |          | 509 (3.2%)       | 143 (13.1%)     |          |
| <b>Family SES</b>           |                  |                 |          |                  |                 |          |
| Better                      | 6207 (42.3%)     | 662 (28.5%)     | <.001    | 6563 (41.3%)     | 306 (27.9%)     | <.001    |
| Middle                      | 7177 (48.9%)     | 1180 (50.9%)    |          | 7818 (49.2%)     | 539 (49.2%)     |          |
| Worse                       | 1296 (8.8%)      | 477 (20.6%)     |          | 1523 (9.6%)      | 250 (22.8%)     |          |
| <b>Community belongings</b> |                  |                 |          |                  |                 |          |
| Agree                       | 9336 (63.6%)     | 608 (26.2%)     | <.001    | 9700 (61.0%)     | 244 (22.3%)     | <.001    |
| not sure                    | 3710 (25.3%)     | 728 (31.4%)     |          | 4124 (25.9%)     | 314 (28.7%)     |          |
| Disagree                    | 1634 (11.1%)     | 983 (42.4%)     |          | 2080 (13.1%)     | 537 (49.0%)     |          |

### Risk of Suicidal Behaviors for Family SES and Community Belonging

Perceived family socioeconomic status and community sense of belonging were each significantly associated with suicide ideation and attempt (Table 1,  $P < .001$ ). These associations remained after controlling for age, sex, race, and transgender status (Table 2). Compared to students perceiving family SES as “better” students perceiving family SES as “middle” or “worse” had increased odds of suicide ideation (aOR 1.50, 95% CI 1.35, 1.66 and aOR 3.16, 95% CI 2.76, 3.62 respectively). This trend of higher risk of suicide ideation with lower family SES was statistically significant ( $P < .001$ ). The risk of suicide attempt also increased significantly with lower family SES ( $P < .001$ , Table 2)

The adjusted OR of suicide ideation for community sense of belonging was 2.90 (95% CI: 2.58, 3.25) for the “not sure” class and 8.47 (95% CI: 7.55, 9.51) for “disagree” class, compared to students who agreed community sense of belonging matters ( $P < .001$ , Table 2). The relationship between community sense of belonging and suicide attempt was similar.

Table 2. Odd ratios of suicide ideation and suicidal attempt for family SES and community belongings after adjustment of age, sex, race, and transgender covariates.

| Predictor                   | Suicide ideation |                   |          | Suicidal attempt |                   |          |
|-----------------------------|------------------|-------------------|----------|------------------|-------------------|----------|
|                             | N (event/total)  | OR (95% CI)       | <i>P</i> | N (event/total)  | OR (95% CI)       | <i>P</i> |
| <b>Family SES</b>           |                  |                   | <.001    |                  |                   | <.001    |
| better                      | 662/6869         | 1 (ref.)          |          | 306/6869         | 1 (ref.)          |          |
| middle                      | 1180/8357        | 1.50 (1.35, 1.66) |          | 539/8357         | 1.42 (1.23, 1.65) |          |
| worse                       | 477/1773         | 3.16 (2.76, 3.62) |          | 250/1773         | 3.08 (2.57, 3.69) |          |
| <b>Community belongings</b> |                  |                   | <.001    |                  |                   | <.001    |
| agree                       | 608/9944         | 1 (ref.)          |          | 244/9944         | 1 (ref.)          |          |
| not sure                    | 728/4438         | 2.90 (2.58, 3.25) |          | 314/4438         | 2.85 (2.40, 3.39) |          |
| disagree                    | 983/2617         | 8.47 (7.55, 9.51) |          | 537/2617         | 8.99 (7.66, 10.6) |          |

ORs were adjusted by age, sex, race, and transgender

### Stratification analysis of Suicidal Behaviors for Family SES and Community Belongings

The association of perceived family SES to suicide ideation was not modified by age, sex, race, or transgender status ( $P > .05$ ). However, the association of community sense of belonging to suicide ideation was modified by age and transgender status ( $P < .05$ ). For suicide attempt, the associations of both perceived family SES and community sense of belonging were modified by age, race, and transgender status ( $P < .05$ ).

The stratified analysis found that suicide ideation risk increased significantly as community sense of belonging worsened for students regardless of their age and transgender status ( $P < .05$ , Table S1). However, the risk increased steeply in young students and students answering no to transgender status questions (Table S1). Like suicide ideation, suicide attempt risk also increased significantly as perceived family SES and community sense of belonging worsened for students regardless of age, race, and transgender status ( $P < .05$ , Table S2). However, generally the risk was greater for participants who were young, or white, or classified by the “no” transgender status group (Table S2).

## DISCUSSION

We found a significant increase in suicide ideation and attempt in youth perceiving low socioeconomic status or poor community sense of belonging. These findings were consistent in our stratification analysis regardless of age, race, or transgender status demographic variables.

An existing study using German microcensus data hypothesized that current levels of low socioeconomic status and high social isolation are linked to increased suicide rates.<sup>9</sup> The study suggests that the interaction between mental illness and social isolation should be further explored as a risk factor for suicide.

The limitations of our study include an inability to establish causality because of the cross-sectional study design. The self-reported questionnaires and retrospective nature of data collection are also subject to recall bias. There may be other important risk factors for suicide behaviors including lack of sleep, school safety, and neighborhood socioeconomic status which were not accounted for in our study design. Future studies are needed to explore how these variables are interrelated with family-level SES and community sense of belonging.

Our conclusion contributes to literature regarding the important role that social determinants contribute to mental health and well-being and can serve to inform advocacy and policy priorities for Vermont. With their ability to connect families to resources and community services, school social worker capacity should be maximized.<sup>10</sup> Comprehensive mental health training for educators would equip them with the tools and resources to support marginalized Vermont youth.<sup>11</sup>

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