Differences in Cortisol Levels in Depressed Adolescents Who Engage in Non-Suicidal Self-Injury

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Introduction

- Adolescents are particularly vulnerable to Major Depressive Disorder (MDD), with 20% experiencing depression before adulthood
- Non-suicidal self-injury (NSSI) often accompanies adolescent depression and may serve to reduce distressing affect, inflict self-punishment and/or signal personal distress to others
- Prior research suggests an underlying mechanism of NSSI and its relationship to the hypothalamic-pituitary-adrenal (HPA) axis, where stress hormones such as cortisol are regulated and released throughout the body in response to stress.
- Youth engaging in NSSI have shown blunted reactivity to stress in the HPA axis by producing lower levels of cortisol, and elevated levels for the cortisol awakening response (CAR)
- This study explores if depressed adolescents with or without histories of NSSI differ in HPA axis functioning.

Method

Participants:

- 30 adolescents ages 12-17 (8 assigned male at birth, 22 assigned female at birth) diagnosed with MDD
- 14 had histories of engaging in NSSI

Cortisol Reactivity:

- Trier Social Stress Test (TSST) to evoke a stress response: a valid and reliable measure consisting of three parts:
    1. The participant is asked to prepare a speech
    2. Participant delivers the speech in front of an audience
    3. The participant is asked to perform an arithmetic task in front of the audience
    Before and at regular intervals afterwards, the participant provides a saliva sample that will be used to measure cortisol levels.

Cortisol Awakening Response (CAR)

- Participants provides salivary samples at home upon awakening, 15 minutes and 30 minutes post-awakening to measure the CAR

HPA axis Summary Measures

- Area Under the Curve with respect to ground was calculated for repeated TSST and CAR cortisol assays

Results

One-Way ANOVA:

- There was a significant difference in CAR AUCg *($F= 5.4$, $p= 0.036$)* accounted for by significant differences in cortisol levels 30 minutes post-awakening *($F= 8.7$, $p= 0.011$)* between depressed adolescents with and without a history of NSSI (*Figure 1)*
- No significant difference in TSST cortisol reactivity AUCg *($F= 0.71$, $p= 0.42$)*

Correlational Analyses:

- Significant correlation between CAR AUCg and NSSI engagement *($r= 0.50$, $p= 0.041$)*
- No significant correlation between TSST AUCg and NSSI engagement
- Significant correlation between CAR AUCg and TSST AUCg *($r= 0.57$, $p= 0.006$)*
- Significant correlation between sex and CAR AUCg *($r= -0.44$, $p= 0.042$)*, indicating males had higher CAR levels

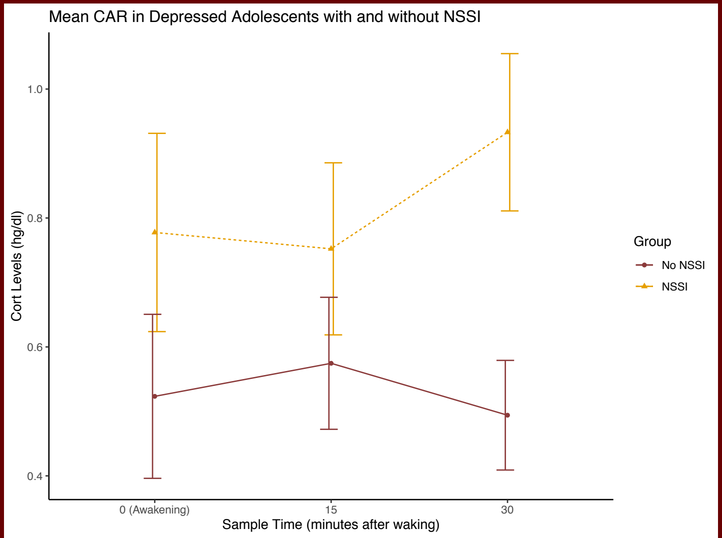

Figure 1: Mean CAR cortisol levels at awakening, 15 minutes and 30 minutes post-awakening among depressed adolescents with versus without NSSI. There is a significant difference accounted for at the 30 minute time point.

Discussion

- The results support the hypothesis that depressed adolescents who have engaged in NSSI have higher CAR levels than depressed adolescents who have not.
- The hypothesis that cortisol reactivity in response to the TSST would be lower in depressed adolescents who have engaged in NSSI than depressed adolescents who have not was not supported. This could be accounted for by a small sample size, or that most of the depressed adolescents who engaged in NSSI hadn't done so recently.
- This study had limitations due to a small sample size, single assessment days for CAR, and considerable variability in the recency and extent to which youth engage in NSSI.
- Future research should continue to explore differences in HPA Axis functioning in depressed adolescents who engage in NSSI using a larger sample size.

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