A Network Approach to Understanding the Inter-relationship between Depressive and Anxiety Symptoms in Suicidal Ideation

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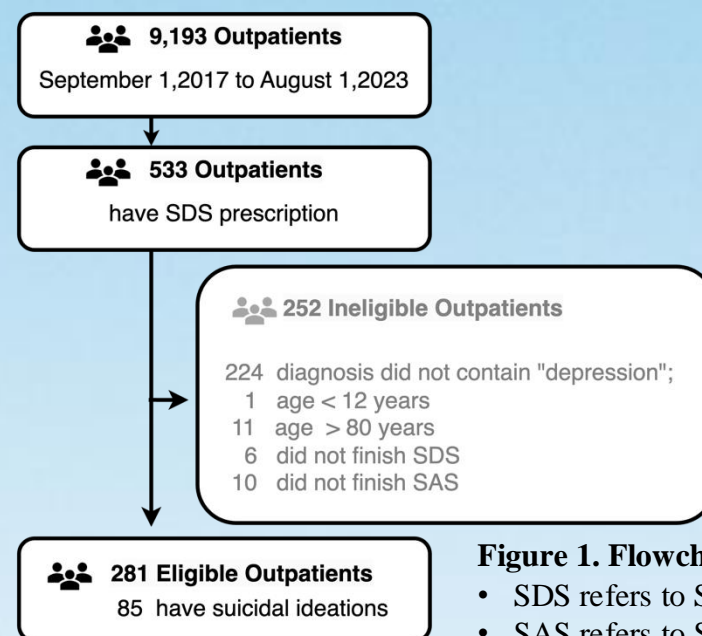
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INTRODUCTION

- Suicidal ideation (SI) refers to thoughts or desires to end one's life, ranging from passing thoughts to persistent feelings of hopelessness and worthlessness (Klonsky, May, & Saffer, 2016).

- Individuals with comorbid depression and anxiety are prone to experiencing more frequent and severe SI. However, depression and anxiety are not simple concepts but rather consist of various components or symptoms.

- The emerging **Network Theory of Mental Disorders** (Borsboom, 2017) provides a novel understanding of how the dynamic interplay of different symptoms influences or exacerbates SI.

METHODS

- We identified outpatients with suicidal ideation from medical records and applied two **Network Analyses** to quantify these inter-relationships.

9,193 Outpatients
September 1,2017 to August 1,2023

533 Outpatients
have SDS prescription

252 Ineligible Outpatients
224 diagnosis did not contain "depression";
1 age < 12 years
11 age > 80 years
6 did not finish SDS
10 did not finish SAS

281 Eligible Outpatients
85 have suicidal ideations

Figure 1. Flowchart and details for the dataset development.
- SDS refers to Self-Rating Depression Scale,
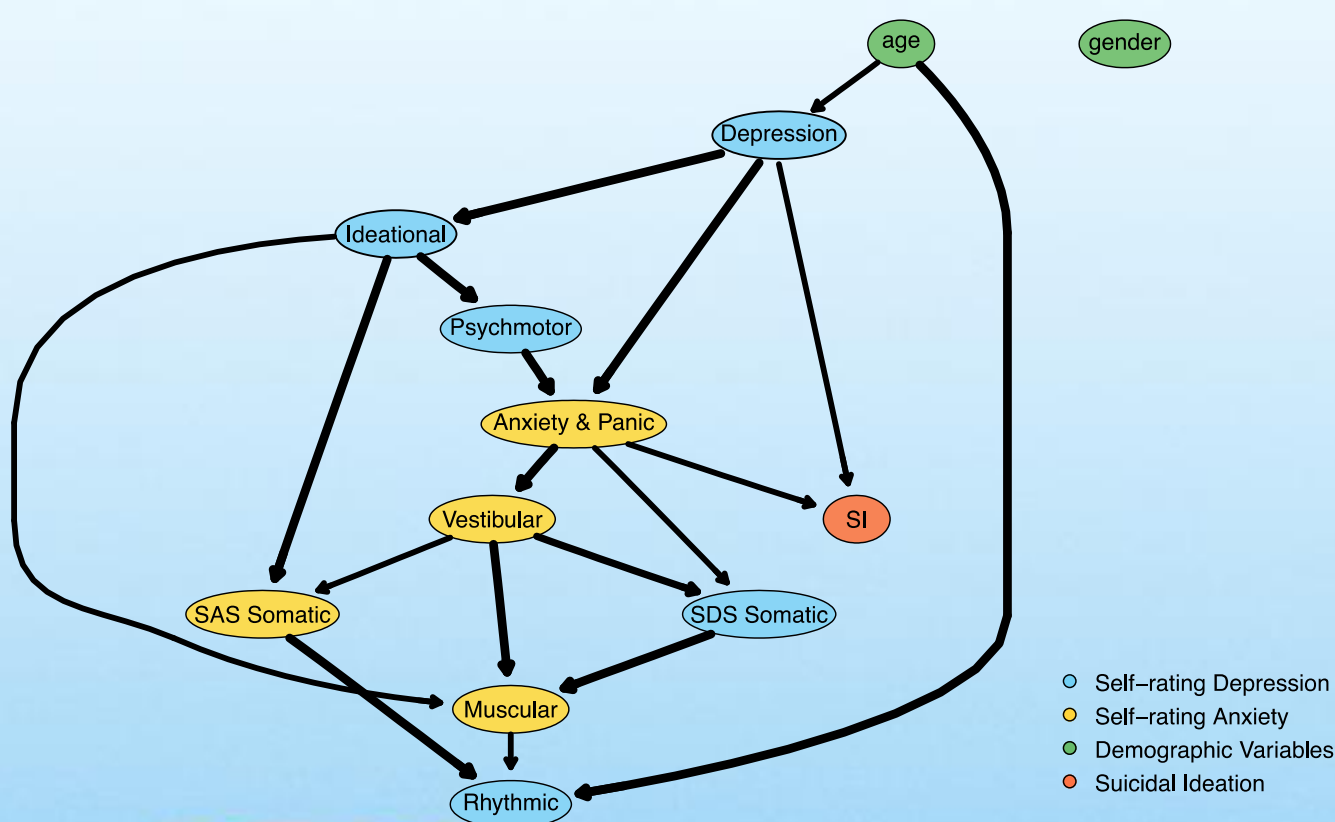- SAS refers to Self-Rating Anxiety Scale.

RESULTS

Table 1. Demographic and clinical characteristics of the outpatients.

	Outpatients without SI (N=196)	Outpatients with SI (N=85)
Gender		
Male	60 (30.6%)	13 (15.3%)
Female	136 (69.4%)	72 (84.7%)
Age (year)		
Mean (SD)	43.9 (21.7)	37.5 (20.5)
Median [Min, Max]	39.0 [12.0, 80.0]	35.0 [13.0, 75.0]
SDS stratifications		
None (SDS < 50)	19 (9.7%)	2 (2.4%)
Mild (50 ≤ SDS < 60)	45 (23.0%)	11 (12.9%)
Moderate (60 ≤ SDS < 70)	76 (38.8%)	30 (35.3%)
Severe (SDS ≥ 70)	56 (28.6%)	42 (49.4%)
SAS stratifications		
None (SAS < 50)	76 (38.8%)	15 (17.6%)
Mild (50 ≤ SAS < 60)	56 (28.6%)	16 (18.8%)
Moderate (60 ≤ SAS < 70)	47 (24.0%)	31 (36.5%)
Severe (SAS ≥ 70)	17 (8.7%)	23 (27.1%)

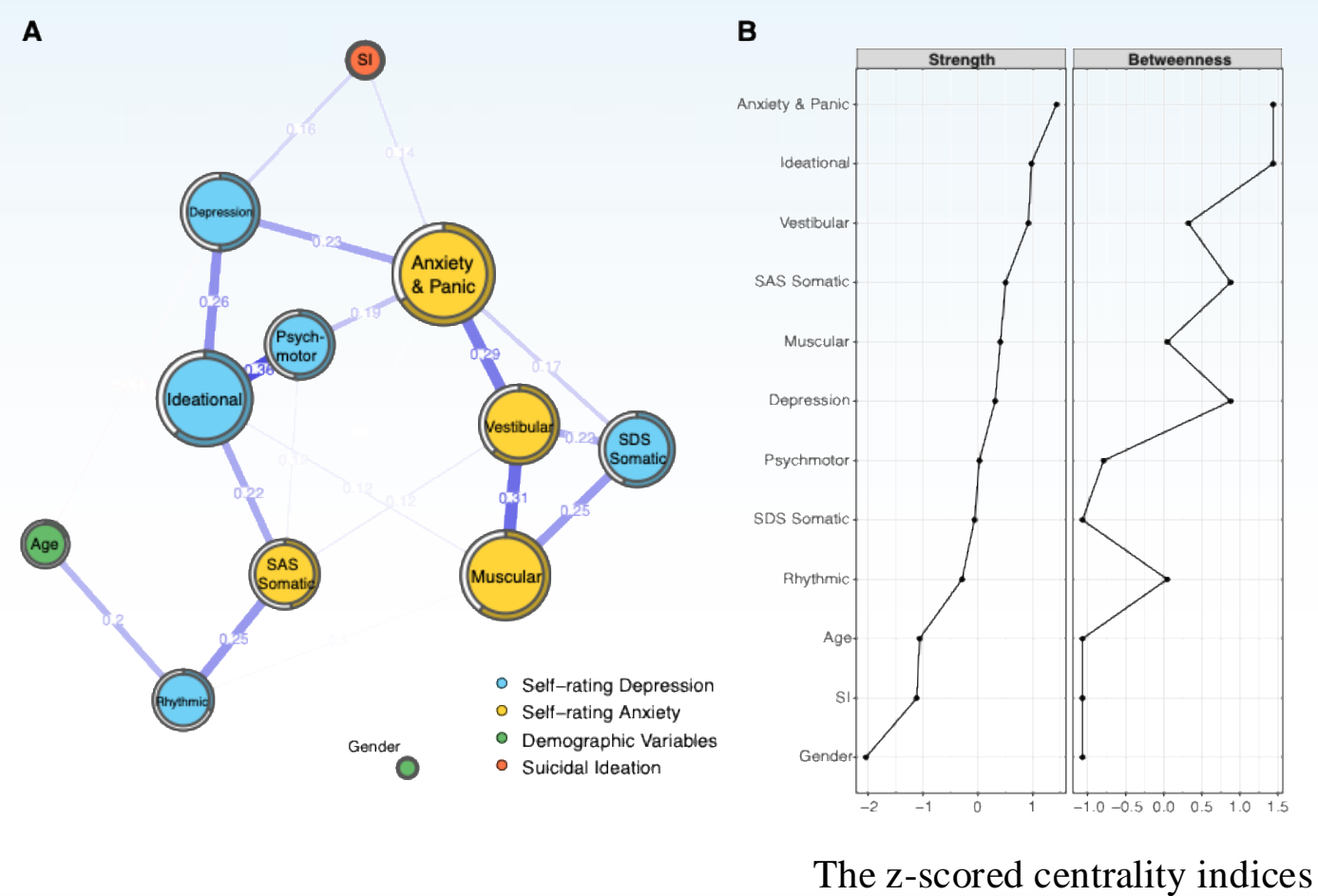**Sample characteristics of outpatients reported suicidal ideation.**

1) Proportion of women is higher; 2) Average age is relatively younger;

3) More than 80% of them are in an anxiety state.

Figure 2. Regularized partial correlation network with weighted edges

The z-scored centrality indices

- 'Anxiety and Panic' and 'Depression' had moderate direct links to SI.

- 'Anxiety and Panic' was the most central node in the network.

Figure 3. Bayesian network with directional edges (directed acyclic graph)

○ Self–rating Depression
○ Self–rating Anxiety
○ Demographic Variables
○ Suicidal Ideation

1. Depression → SI

2. Depression → Anxiety & Panic → SI

3. Depression → Ideational → Psychmotor → Anxiety & Panic → SI

DISCUSSION

- Network analysis is a novel method to quantify and visualize the inter-relations among symptoms, and it allows researchers to identify symptoms (clusters) with higher therapeutic potential through the measure of node centrality

- This study emphasizes the comprehensive consideration of the interaction of depression and anxiety symptoms when assessing and treating suicide risk.

- Preliminary results suggest that in individuals with depression and co-anxiety, prioritizing intervention of anxiety mood symptoms may be a more effective intervention strategy.