The Effect of Agitation On the Sensitivity of the Columbia Suicide Severity Rating Scale Screener to Suicide Risk After Emergency Department Visit

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INTRODUCTION

- The Columbia-Suicide Severity Rating Scale Clinical Practice Screener (CSSRS)[1] is used to screen for suicide risk among emergency department (ED) patients but is insensitive to suicide risk.[2]
- Agitation may portend suicide risk given its relationship with multiple factors including disinhibition, psychiatric illness, and substance abuse. Agitation can be assessed in moments.
- **We examined whether adding a measure of agitation to the CSSRS would improve the screener's performance in the ED.**

METHODS

Sample and Setting

- Adult ED patients at a safety net hospital with suicide screening and agitation data (*N*=16,467).

Agitation Measures

- The Richmond Agitation and Sedation Scale (RASS[3]) is administered to medical ED patients. It is a single-item, 10-point scale that ranges from sedation (-5=unarousable) to agitation (+4=combative and immediately dangerous).
- The Behavioural Activity Rating Scale (BARS[4]) is administered to Psychiatric Emergency Service (PES) patients. It is a single-item 7-point measure ranging from 1 (difficult or unable to rouse) to 7 (violent).
- Both take only moments to administer. A RASS>0 or BARS>4 in the dataset was considered positive for agitation.

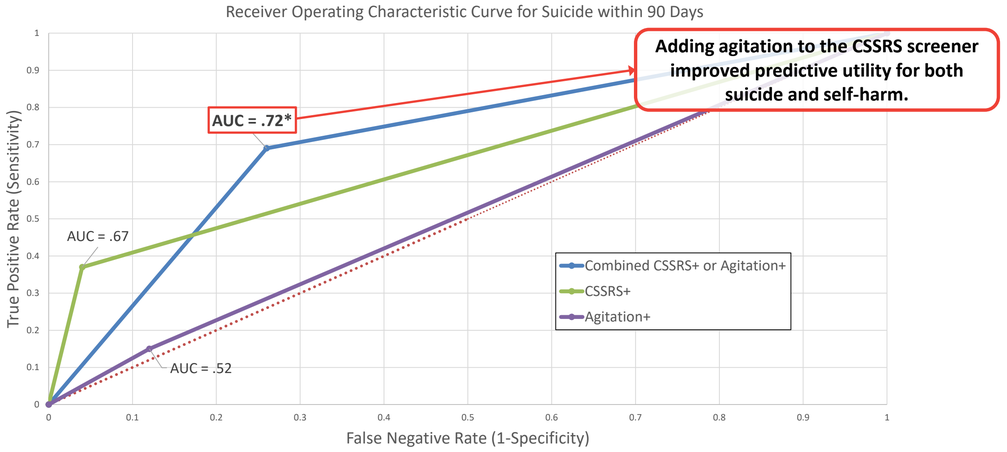
Outcomes

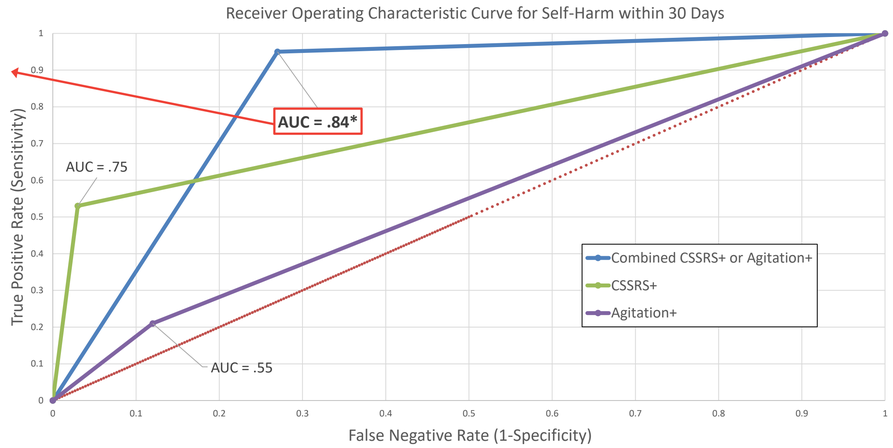
- Suicide within 90 days after ED discharge, reported by the state health department.
- Intentional self-harm within 30 days after ED discharge, reported by the state hospital association.

Analyses

- Receiver operating characteristic (ROC) curves and multivariable logistic regressions were calculated. Patients not reported dead or to have returned to EDs across the state for self-harm were presumed alive or to not have self-harmed.

RESULTS





Performance of Agitation-Augmented Suicide Screener for Predicting Suicide or Self-Harm within 30 and 90 Days

	Suicide death within 90 days[a]		ED visit for self-harm within 30 days[b]	
	30 days	90 days	30 days	90 days
CSSRS+ OR Agitation+ (*N*)	2	9	40	66
CSSRS- AND Agitation- (*N*)	1	4	2	11
Sensitivity	0.67 (0.13 – 1.00)	0.69 (0.44 – 0.94)	0.95 (0.89 – 1.00)	0.86 (0.78 – 0.94)
Specificity	0.74 (0.73 – 0.75)	0.74 (0.44 – 0.94)	0.73 (0.73 – 0.74)	0.74 (0.73 – 0.74)
Positive predictive value	<0.01 (0.00 – <0.01)	<0.01 (0.0007 – 0.0035)	0.01 (0.01 – 0.02)	0.02 (0.02 – 0.03)
Negative predictive value	0.99 (0.99 – 1.00)	0.9997 (0.9993 – 1.000)	0.99 (0.99 – 1.00)	0.99 (0.99 – 0.99)
Area under ROC curve	0.70 (0.38 – 1.04)	0.72 (0.56 – 0.87)	0.84 (0.77 – 0.92)	0.80 (0.74 – 0.86)

Multivariable Logistic Model for Agitation-Augmented Screener for Suicide or Self-Harm within 30 and 90 Days

	Suicide death within 90 days[a]		ED visit for self-harm within 30 days[b]	
	N	Odds ratio (95% CI)	*N*	Odds ratio (95% CI)
Agitation+ OR CSSRS+	9	1.50 (0.46 – 4.87)	40	**16.05 (4.15 – 62.08)**
Self-harm at index encounter	3	4.92 (1.53 – 15.85)	7	1.97 (0.88 – 4.42)
Male sex	11	3.15 (0.91 – 10.93)	20	0.55 (0.30 – 1.02)
Age	38.0 (*IQR* 19.0)	1.00 (0.97 – 1.04)	35.0 (*IQR* 14.5)	0.99 (0.98 – 1.02)
Homelessness	3	1.61 (0.52 – 4.94)	11	**2.06 (1.03 – 4.10)**
Mental health diagnosis at index encounter	11	4.56 (1.22 – 17.04)	31	1.16 (0.57 – 2.37)
Substance use diagnosis at index encounter	9	1.77 (0.64 – 4.92)	24	1.04 (0.56 – 1.93)
Psychiatric assessment during index encounter	8	1.26 (0.23 – 7.08)	36	1.48 (0.45 – 4.85)
Hospital admission at index encounter	4	0.49 (0.09 – 2.66)	3	**0.24 (0.06 – 0.99)**

CI: confidence interval; CSSRS: Columba-Suicide Severity Rating Scale Clinical Practice Screener; IQR=inter-quartile range; [a] 16,467 encounters, model Wald $\chi^2(9)$ 31.1617, p=0.0003; [b] 10,439 encounters, model Wald $\chi^2(9)$ 68.5605, p<.0001

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DISCUSSION

- Adding an objective agitation measure to the CSSRS improved sensitivity to suicide within 30 days of an ED visit from .18 to .67 without sacrificing specificity.
- **Adding agitation to the CSSRS would identify about 7 additional patients who die by suicide per 10,000 ED patients compared to the CSSRS alone.** In this ED with 120,000 annual visits, this agitation-augmented screener would help save 83 lives per year.
- The agitation-augmented screener also correlated better with future self-harm in multivariable logistic regression and ROC analyses.
- Findings are limited by the rarity of suicide, single site recruitment, and possible bias in administration of agitation scales, which are more commonly used with psychiatric patients in this setting. Encounters with missing data over the study period were excluded.
- These findings suggest we look beyond suicidal ideation alone and consider additional symptoms when screening for suicide and self-harm risk in EDs. Validation of suicide risk screeners should utilize large, real-world datasets rather than rely on smaller trial data.

1. Posner et al, 2011, PMID: 22193671.
2. Simpson et al, 2021, PMID: 33346922.
3. Ely et al, 2003, PMID: 12799407.
4. Swift et al, 2002, PMID: 11777497.