"Predictometer" Model to Reduce 90-day Readmission

in a psychiatric inpatient setting

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BACKGROUND

- Relapse is biggest challenges in patients with psychiatric illness. The cost of a relapsed patients is 2-5 times higher due to increased hospitalizations, and outpatient services.
- Psychiatric readmission is indicative of the poor quality of care and patient outcomes leading to increased healthcare burden

OBJECTIVES

- To develop a risk index model that predicts a patient's risk of 90-day psychiatric readmission within of discharge.
- To identify modifiable and non-modifiable risk factors and outline effective intervention strategies to reduce rehospitalization rates.

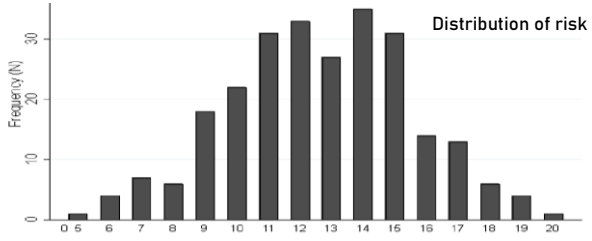
METHODS

- This is a retrospective study including adult patients discharged from GMH in 2018 and 2019.
- Primary outcome: readmission within 90 days of discharge from index admission.
- Multivariable logistic regression models 1-3 were fit to predict 90-day readmission, and transformed into risk-index model by using odds ratio (OR) and 95% CI into a point value for each category (demographics, comorbidities, and previous hospital outcomes)
- To demonstrate the ability of model to predict the risk of 90-day readmission, we generated a C-statistic using STATA.

Multivariate predictors of 90-day readmission

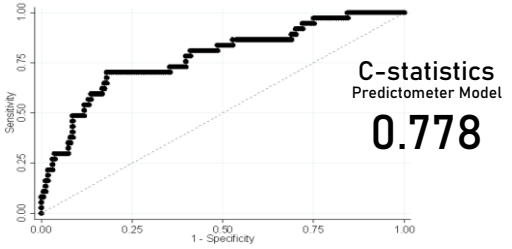
Variable	Not readmit		90-day readmit		Regression model 3	
	N	%	N	%	OR	95% CI
N	309	84.9	55	15.1	-	-
Age at admission						
18 – 35 years	113	36.6	18	32.7	0.84	0.27 – 2.66
36 – 50 years	116	37.5	24	43.6	1.51	0.54 – 4.19
+ 50 years	80	25.9	13	23.6	Reference	
Sex						
Male	168	54.4	32	58.2	0.85	0.31 – 2.31
Female	141	45.6	23	41.8	Reference	
Race						
White	229	74.1	44	80.0	Reference	
American Indian	27	8.7	5	9.1	0.39	0.06 – 2.61
African American	46	14.9	5	9.1	0.68	0.15 – 3.13
Other demographics						
College	79	25.6	14	25.5	0.48	0.17 – 1.41
Current suicidal ideations	109	37.2	29	54.7	1.68	0.65 – 4.37
Trauma history	153	62.4	35	71.4	1.16	0.39 – 3.36
Comorbidities						
Depressive disorders	137	44.3	30	54.5	1.06	0.36 – 3.08
Anxiety disorders	67	21.7	15	27.3	1.45	0.53 – 3.99
Personality disorders	20	6.5	6	10.9	2.15	0.54 – 8.57
Current tobacco use	224	77.5	43	79.6	0.47	0.15 – 1.41
Alcohol use disorder	72	23.3	21	38.2	1.92	0.75 – 4.91
Substance use disorder	133	43.0	29	52.7	1.12	0.46 – 2.72
Hospital outcomes						
Voluntary admission	42	14.4	14	26.9	1.56	0.59 – 4.09
Previous hospitalization >3	135	43.7	42	76.4	3.06*	1.21 – 7.79
Medication noncompliance	182	65.7	31	63.3	0.91	0.37 – 2.25
LAI antipsychotic	104	33.7	13	23.6	0.51	0.16 – 1.65
Length of stay						
<15 days	167	54.0	32	58.2	1.01	0.25 – 4.01
15 – 30 days	78	25.2	16	29.1	1.17	0.27 – 5.06
30+ days	64	20.7	7	12.7	Reference	
Disposition						
Home or other facility	252	81.6	36	65.5	Reference	
Group home/residential care	57	18.4	19	34.5	2.39	0.84 – 6.86

Distribution of risk scores



Predictometer model for 90-day readmission

Cat.	Variable	Value	Score
DEMOGRAPHICS	Age at admission	18 – 35 years	1
		36 – 50 years	2
		+ 50 years	0
	Gender	Female	1
		Male	0
	Race	White	2
		Non-white	0
	Education	College	0
		High school	1
	Current suicidal ideation	No	0
		Yes	1
	Trauma history	No	0
		Yes	1
COMORBIDITIES	Depressive disorders	No	0
		Yes	1
	Anxiety disorders	No	0
		Yes	2
	Personality disorders	No	0
		Yes	2
	Alcohol abuse	No	0
		Yes	2
	Substance abuse	No	0
		Yes	1
OUTCOMES	Admission status	Involuntary	0
		Voluntary	2
	Previous hospitalizations	=3	2
		>3	4
	Medication compliance	No	1
		Yes	0
	Antipsychotic	Oral	1
		LAI	0
	Length of stay	<15 days	2
		15 – 30 days	1
		+30 days	0
	Disposition	Others	0
		Group home/residential	2
Total possible score			**30**



RESULTS

- 90-day readmission rate was 15.1%. A higher proportion of readmits were middle-aged adults, male and White.
- Comorbid anxiety (OR 1.5), personality disorder (OR 2.2), alcohol (OR 1.9) and SUDs (OR 1.1) had higher odds of 90-day readmission.
- Past voluntary admission (OR 1.6) and length of stay (LOS) <30 days and disposition to group home (OR 2.4), and >3 past hospitalizations (OR 3.1) increased the odds for 90-day readmission.
- Lower proportion of patients discharged on LAI were readmitted (23.6% vs. 33.7%).
- A one-point increase in score on predictometer model increased the odds of 90-day readmission by 33% (95% CI 1.16–1.52). The risk index had moderate discriminative capacity with a C-statistic of 0.778

CLINICAL IMPLICATION

- Comprehensive risk assessments using predictometer model can be translated into psychiatric practice to determine definite transitional care post-discharge per patient to reduce readmission rates and limit the overuse of utilization of resources.
- Risk factors that are modifiable may reduce risk of readmission, and non-modifiable factors can help flag at-risk individuals.

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