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READMIT Clinical Risk Index: Identifying Risk Factors to Reduce 30-day Psychiatric Readmissions

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Readmissions

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Abstract

Problem: There has been a growing concern in the past decades over the increase in community-based adults who require readmission to psychiatric care shortly after discharge. It is estimated that nearly half of discharged psychiatric patients will be readmitted within twelve months after discharge. This has been primarily attributed to the absence of screening tools and resources to assists behavioral healthcare providers in identifying socio-demographic factors contributing to readmissions. Screening tools like the READMIT Clinical Risk Index identify patients at risk for psychiatric readmission. This quality improvement project aims to identify socio-demographic factors that lead to 30-day readmission rates through the implementation of the READMIT Clinical Risk Index.

Methods: This quality improvement project used a retrospective chart review with a purposive convenience sample of 96 behavioral health electronic medical records. Data was collected through a two-step process. The first set of data collected patient demographics selecting age, whether participant is black, length of stay, has depression, housing status at discharge, discharged with medication, and has friend support. The second set of data collection captured READMIT scores.

Results: Multiple regression (b =- 0.20, p < .001) demonstrated age to be the primary predictor of an individual's likelihood of 30-day readmission post-discharge. Every one-year increase in age is associated with a 0.20 decline in individuals READMIT scores.

Implications for practice: Providers can identify high risk patients when READMIT Index tool is implemented appropriately. Creating an opportunity for developing,

evaluating, and delivering interventions that integrate individuals into their communities more successfully.

A Quality Improvement: Minimizing the Rate of Readmissions in Clinical Psychiatric Units using the READMIT Clinical Risk Index

There has been a growing concern in the past decades over the increase in community-based adults who require readmission to a higher level of psychiatric care shortly after discharge. The higher levels of psychiatric care are recorded at respite unit admissions and inpatient hospitals. These concerns are built on the assertion that regular re-hospitalizations lead to higher in-patient care costs and the disruption of lives of the victims and negatively affecting their ability to live independently. (Taylor et al., 2016). Furthermore, there is evidence from literature that indicates there is an anticipation to readmit about 40% to 60% of hospitalized psychiatric patients within twelve months of discharge (O'Connell et al., 2018). This has been primarily attributed to the absence of a procedure to assists behavioral healthcare providers in identifying these patients at risk.

Recurrent readmissions into a mental health facility have significant effects on the individual and the community in which they live. Increased readmissions within 30 days of discharge have been linked to disruption of daily living, increased depression, suicidal ideation, and increased medical cost for mental health facilities (Jiang et al, 2021). Ryan 2020 reviewed 693 medical records and identified that predominant factors included co-morbidity personality disorders (OR=2.1; 95% CI, 1.2-3.5%), African American race (0R=2.7; 95% CI, 1.5-4.8), any prior admissions for medical reasons (OR=3.2, 95% CI, 1.9-5.4), the need for use of emergency medications at the time of hospitalization (OR-2.9; 95% CI, 1.4-6.1) and poor follow up appointment documentation after discharge (0R=1.7; 95% CI, 0.99-2.8). In addition to that, about 78% of schizophrenia and nearly 89% of mood disorder admissions are usually discharged for home care however in

comparison just about 62% of non-mood admissions are discharged for home care (Heslin and Weiss, 2015). Which leaves to question, are the needs of those being discharged being met prior to leaving the hospital?

In effect, schizophrenia, depression, and bipolar disorder are among the three most common clinical risk factors for readmission to an acute inpatient psychiatric facility (Donisi et al, 2016) It is necessary to understand the patient demographics of those affected by schizophrenia, depression, bipolar, and substance use disorder to address readmission. People who meet certain conditions may be at a higher risk of readmission within 30-days of discharge (Donisi et al., 2016).

Demographics and certain conditions that increase risk of readmission include patients that are African American, discharge diagnosis of schizophrenic disorder, comorbid personality disorder, prior medical admission, prior psychiatric hospitalization, use of emergency medications during hospitalization, and having no documented follow-up appointment at discharge have a higher probability for readmission (Rylander et al., 2016). It is imperative that during the completion of the screening process, specific attention is given to the patient that presents with the described characteristics

The average cost of a readmission in the United States is around $8,200 per readmission per person and the average number of individuals with a mental health disorder returning to an inpatient psychiatric facility being around 329,400 individuals per year, it has become extremely costly for mental health facilities within the United States (Jiang et al., 2021). These statistics also speak to patient outcomes, high readmission rates and cost are also linked to poor patient outcomes due to a lack of

adequate access to community mental health resources and difficulties adhering to care plans necessary to avoid chronic relapse. Steps taken to reduce the cost of readmission should first include the identification of risk factors that contribute to readmission.

Chang and Chou (2015) encourage the use of a coordinated community service to stabilize discharged patients and promoting their mental stability. Taylor et al. (2016) also explained that patients who honored a minimum of one outpatient appointment had a 50% chance of not being re-hospitalized and an inability to identify adults at risk will negatively impact patient health outcomes.

READMIT Clinical Risk Index

The READMIT tool is a useful tool in identifying at risk persons for psychiatric re-admissions and reducing the re-admissibility rate of persons with behavioral health disorders. The index rate is validated to approximate the risk of a 30-day readmission risk with a moderate discriminative capacity in both validation and deprivation. The indicators and markers including history of repeated admissions (R), emergent nature of the index admission (E), age (A), diagnosis of unplanned discharge (D), medical comorbidity (M), and intensity of outpatient use (I), time in hospital (T).and the variables used for applying this tool are rated on a 0 to 41 score range. An increase in score indicated a probable rise in a 30-day readmission rate by 11% (Ryan, 2020)

Doing a retrospective chart review to determine the 30-day risk factors for readmissions in this population, will help identify readmission risk factors and decrease readmission rates. Reducing readmission rates not only improves the outcomes of the

mental health population, their families, and surrounding communities, it will also improve the hospital budgets (CMS, 2020).

Purpose and Outcome

The purpose of this quality improvement project is to assess the efficacy of the implementation of the READMIT Clinical Risk Index in its ability to accurately identify risk factors for at-risk patients for readmission 30 days post-discharge. The questions used to guide this project are: 1) To what extent does the READMIT Clinical Risk Index predict the likelihood of the readmission of patients discharged from an acute adult inpatient psychiatric facility within 30 days? 2) Of the socio-demographic variables measured with the READMIT Risk Clinical Index, which variables are predictive of 30-day readmission into an acute adult inpatient psychiatric facility

The primary outcome measures of this QI project are to focus on readmission rates within 30 days, provider satisfaction, and improved patient health outcomes of those with a primary psychiatric complaint of anxiety, depression, schizophrenia, bipolar, and/or alcohol or substance use disorder. The second measure is to assess the efficacy of the implementation of the READMIT tool within a psychiatric facility.

Literature Review

A broad review of literature was systematically perused to ascertain statistics, figures, evidence, and scholastic research to support this project. Articles were obtained from the University of Missouri-Saint Louis Library to include APA PsychInfo, CINAHL, and Cochrane Library; global peer-reviewed material with 5-year date compliance, published in English, target demographic 18-to-78-years of age,

investigative information related to readmission rates, and nurse-led initiatives. Articles addressing children, adolescents, and prisoners were excluded.

Key terms and Boolean methods used to complete each search are listed in Appendix A. Searches generated 10,812 articles of which 11 were selected for the literature review. The level of evidence for each article was taken into consideration with the purpose to select articles that were either systematic reviews or meta-analysis (Level I), or controlled trials without randomization (Level III). There are a few qualitative and descriptive (Level IV) studies utilized as well. These articles were more focused on the importance of nurse-led initiatives and the benefit of nurses utilizing tools such as the READMIT. The studies selected concentrated on the impact of identifying readmission risk factors, challenges patients encounter with post-discharge care, effective initiatives in reducing 30-day readmissions into an acute inpatient psychiatric facility, and importance of nurse-led screening education and patient health outcomes.

Inability to identify risk factor for readmission interrupts patient recovery, treatment, and increases risk for unnecessary readmissions (Hairman et al., 2020). Unaddressed risk negatively impacts quality and Medicare reimbursement, and it has a similar impact on the quality and financial performance of an acute care hospital (Jiang et al, 2021). The aim of many predictive models like the READMT is to address potential patient care issues and promptly adjust the care plan to improve patient outcomes (Hairman et al., 2020). Optimally, the implementation of the READMIT tool should be upon patient admission, which allows the care team to respond in a timely manner to improve patient outcomes.

Identifying risk factors is not solely the responsibility of the inpatient care team; family, and other care givers play an important role as well (Colon et al., 2020). Several days post-discharge is the most crucial in decreasing readmission rates (Colon., et al. 2020). Determining the risk of a patient readmitting after they discharge from an acute care setting allows inpatient providers to inform and educate the patient and their caregivers of the potential risk and how to manage them to decrease readmission (Colon et al., 2020). Patient and caregivers should be aware that risk factors change when a patient leaves the controlled setting of a hospitals.

Literature on psychiatric readmission acknowledges the necessity for early detection of vulnerable patients. The evidence also supports the use of strategies such as behavioral health professionals, psycho education, medication, and symptom monitoring, as well as maintaining connections with social services to help sustain mental health stability of individuals diagnosed with a mental health disorder (Taylor et al., 2016).

Though there have been many attempts to identify risk factors for readmission post-discharge and upon admission, there has not been a screening tool successfully implemented. Literature supports the need for screening and support upon admission and post-discharge (Spinner et al., 2020). Patients are most vulnerable for readmission during the first few weeks after discharge, so it is critical for home health, the patient's care giver, and nurses are aware of the increased likelihood of a readmission (Colon et al., 2020).

There is a growing increase of mental health diagnosis and a decrease of nurses in the workforce. This combination makes for grater challenges faced by individuals

suffering from a mental health disorder. Nurses are key in the success of patient treatment, management, and continuity of care (Jutterström et al., 2016). The success of this is completed by the ability of nurses being able to generate evidence and knowledge through evidence-based research to inform practice and improve patient outcomes (Jutterström et al., 2016). Nurses taking part in evidence-based practice has improved patient continuity of care and aided in decreasing readmission rates post-discharge (Lyndon et al., 2020). Follow-up care has traditionally been led by doctors within a hospital setting. There is an even more limited number of doctors, in comparison to nurses. Doctors' heavy patient loads make it more difficult for them than nurses to identify and address patient issues. To combat this growing problem, new models of care must be implemented for improved patient outcome and health maintenance (Lyndon et al., 2020).

Part of these new and improved models focus on nurses acting as patient advocates assessing issues and concerns that patients have (Lyndon et al., 2020). Nurses approach the patient with a holistic view providing patients care plans and treatments for discharge (Lyndon et al., 2020). Surveillance follow-up care implemented by nurses, aims to provide assistance to adherence to follow up appointments, medication management, and community health resources (Lee et al., 2020). Nurse-led care post-discharge results in greater understanding of the patient's diagnosis among caregivers, and improved care quality (Lee et al., 2020). Despite the unparalleled success of nurse-led models, individual nurse confidence in their knowledge and leadership skills are key factors in achieving the desirable impact of their implementation (Kessler et. al., 2019). Continued nurse education on evidence-based practices (EBP), thus, cannot be

overlooked as it is the foundational tenet in nurse-performance excellence. Nursing confidence, made possible through knowledge of current EBP, improves the utility in clinical practice (Kessler et. al., 2019).

Over decades, providers have invested in research and data analysis to develop readmission predictive models specific to acute care (Hairman et al., 2020). Current predictive models available today have been developed using data from acute and post-acute care hospital settings. These models have improved the lives of patients and aided in the effective utilization of hospital resources and reducing overall cost of care.

The READMIT Clinical Risk Index is an instrument designed to determine a patient's probability of readmission to a psychiatric hospital within 30 days (Roque et al., 2017). The READMIT tool was designed to assist clinicians in identifying patients at risk for readmission after being discharged from an inpatient psychiatric facility (Roque et al., 2016). There have been many attempts to identify risk factors for readmission post-discharge and upon admission, however, there has yet to be a successful screening tool implementation. Literature continues to support the need for screening and support upon admission and post-discharge (Spinner et al., 2020). The READMIT tool has been successful in its implementation within the inpatient and outpatient setting.

The gaps in the literature have limited information on the broad range of clinical risk factors for 30-day readmission. There is also limited reliability because of the discrepancy in the risk factors. Studies presented in this literature review identified mood disorders or personality disorders as increased risk factors for readmission, while others argued that length of stay, previous admissions or socio-economic status were the specific factors contributing to increased 30-day readmission rates. Despite the

discrepancies, there is a comprehensive agreement that there needs to be a clinician led initiative that can cohesively identify modifiable risk factors for decreasing readmission rates (Hariman, et al., 2020).

IOWA model will be applied to this design as it is the first of its kind to be applied in this facility. It also has the potential for continued change and improvement. The Iowa model creates a culture for continuous improvement. Inquiries about practice creates an opportunity for developing new and efficient modes of practice and patient care. (Cullen et al., 2018). This process will lend the opportunity for further prospects into the validity and effectiveness of the READMIT tool.

In summary, both arguments carry significant weight, and are variable components of the READMIT Clinical Risk Index. Identifying risk factors and subsequently maintaining interprofessional nurse collaboration with social workers, case managers, court personnel, law enforcement, physicians, pharmacists, and the patient's primary care medical home is essential to mitigating readmission, relapse, and suicide. The literature supports professional training that boosts confidence, the use of standardized tools to improve patient outcomes, and the relevance of identifying at-risk patients in the prevention of psychiatric readmissions. Nurse-led initiatives that address barriers such as low literacy, inadequate resources, and poor access are necessary in assisting at-risk patient to safely navigate healthcare post discharge. The publications evaluated support the DNP project's requirement to aid in the identification of persons at risk of psychiatric readmission through the utilization of the READMIT.

Methods

Design

This quality improvement (QI) project utilized a retrospective chart review design, in which the relationship between READMIT scores and psychiatric readmissions were examined. This QI project utilized the IOWA Model. The intended timeframe of the project was January 3, 2022-March 31, 2022, with a retrospective collection of data.

Setting

The setting for this QI project took place at an inpatient, psychiatric unit located in a small Midwestern suburban town. The hospital, in which participants were selected, are housed in a 497-bed short term acute care center. Inpatient clinical services include cardiovascular, neuroscience, oncology, orthopedic, critical care, and psychiatry.

Sample

A purposive sample of 100 behavioral health charts were selected for review. The inclusion criteria included adults with a primary complaint of depression, anxiety, schizophrenia, bipolar, alcohol or substance use disorder, aged 18-78 admitted between September 1, 2021-October 31, 2021, and discharged or readmitted between November 1, 2021-December 31, 2021, at SSM Health DePaul Hospital-St. Louis. Exclusion criteria included patients less than 18 years and over the age of 78, and were not admitted before September 1, 2021and after October 31, 2021, to SSM Health DePaul Hospital-St. Louis for a primary complaint of depression, anxiety, schizophrenia, bipolar, alcohol or substance use disorder.

Data Collection/Analysis

All data was de-identified and collected through a retrospective chart review. Demographics on each patient was collected using a patient demographic variable collection form (Appendix E), focusing on age, day to readmission, gender, race, primary complaint, ethnicity, housing status at admission and discharge, length of stay, READMIT score, insurance, employment status, substance use disorder, education, medication at discharge, and support system. The chart review also collected readmission risk scores through the implementation of the READMIT tool. Multiple regression and descriptive statistical analysis were used to analyze the data.

Approval Process

Final approval from the Institutional Review Board (IRB) by the University of Missouri-St. Louis and SSM Healthcare has been attained. The projected risks and discomfort for this project are minimal, there is no greater risk than what the participant may experience in everyday life.

Procedures

An initial meeting and presentation of this QI project took place with key stakeholders. One-hundred charts were selected for review with psychiatric admissions between September 1, 2021-October 31, 2021, readmissions and/or discharges were assessed between November 1, 2021-December 31, 2021. Data analysis methodswere utilized to assess the relationship between 30-day psychiatric readmissions risk factors and READMIT scores.

Results

Participant Demographics

Data were collected from the mental health records of 96 White (28.1%) and African American (71.9%) females (44.8%) and males (55.2%). Nearly all the participants identified as Non-Hispanic/ Latino (n =95). The age of participants ranged from 20 to 78 years, with the average age being 41.72 years (SD = 16.14). About 94% (n=90) of the participants were unemployed at the time of data collection, whereas six participants were employed. The vast majority of participants were insured (n=79, 82.3%).

Participant Mental Health History

As shown in Appendix F, the majority of the sample (55.2%) had a history of depression, followed by anxiety, bipolar/schizophrenia, and alcohol/substance misuse. Relatively few participants (n=27) self-reported a substance disorder. Ethanol alcohol, cannabis, and amphetamines were the substances used among the 27 participants who self-reported a substance use disorder (see Appendix F). Approximately 87% (n =83) of participants' housing status was residential at admission and at discharge. The length of rehabilitation ranged from 1 to 148 days with an average of 10.63 days (SD =16.96). More than half of the participants were discharged without medication (n=51, 53.1%). In terms of support systems, 60% receives family support, 30% receives support from friends, and 10% receives support from other sources.

Descriptive Statistics: Re-Admit Score

The re-admit score, which is the dependent measure, ranged from 13 to 32, with average re-admit score being 18.52 (SD= 4.51). The skewness and kurtosis scores fell within the ranges of normality. Skewness indicates the symmetry of the distribution. Normal distributions have a skewness value of 0, which indicates perfect symmetry. Specifically, the skewness score of 0.43 for the re-admit score, indicates slight positive skewness, which falls within the normal range between -1 to +1. Kurtosis indicates the steepness of

the curve the distributions forms. Normal distributions have a kurtosis value of 0. Specifically, the kurtosis score of -0.47 for the re-admit scores fell within the normal range between -3 to +3. These two statistics taken together would indicate that the re-admit score distribution does not significantly differ from a normal distribution. Thus, parametric statistical analysis is appropriate to use as the inferential statistical approach.

Multiple Regression Results

Multiple regression was used to examine the most important determinants of individuals tendency to be re-admitted (as measured by re-admit scores) among a set of demographics and mental health history variables. A statistically significant F statistic for the complete model, and statistically significant βs for each of the individual variables in the model both provide statistical support for demographic and mental health history variables as significant predictors of individuals' tendency to be readmitted (as measured by re-admit scores).

Data from 96 participants were included in the multiple regression analysis. Mahalanobis distance scores identified one multivariate outlier, which was removed from analysis. Therefore, the analytic sample included 95 participants. Not all assumptions of multiple regression were met. Specifically, as shown in Appendix G, there were threats of multicollinearity (highlighted in grey) as the tolerance (normal range is above 0.20) and variance inflation factors statistics (normal ranges are below 4.00) for the anxiety, depression, and bipolar variables fell outside of normal ranges. Given these challenges, the anxiety and bipolar variables were removed from subsequent analyses, and the analyses proceeded with the depression variables. Furthermore, the regression standardized residuals formed a normal distribution, which shows adherence to the

normality assumption of regression (see Appendix H). Lastly, the homoscedasticity

assumption was somewhat met as shown in Appendix I.

The model, which contained the demographic and mental health history variables,

explained about 61% ($R^2 = 0.61$) of the variance in re-admit scores, which was a

statistically significant amount of explained variance, $F(8, 86) = 16.77, p < .001$. As

shown in Appendix J, age ($b =- 0.20, t = - 7.61, p < .001$) was the only statistically

significant predictor of individuals' re-admit scores. Specifically, every one-year increase

in age is associated with a 0.20 decline in individuals re-admit scores. Therefore, the set

of demographic and mental history variables can be used to predict an individual's

tendency to be re-admitted to a mental health facility; however, the *best* determinant

among the set of variables is the individual's age.

Discussion

The objective of this quality improvement project identified specific risk factors

for 30-day readmission into an inpatient psychiatric facility. The READMIT Clinical

Risk Index score of individuals was surprisingly not as strong as a predictor for

readmission as previously suspected. Independently the READMIT score could not stand

as the sole indicator for readmission. Other variables needed to be considered as well. Of

the analyzed data age was the most reliable predictor for readmission, the younger the

individual the higher the READMIT score, thus increasing the likelihood of readmission.

Considering the other variables presented in the statistical data, the diagnosis of

depression was also a predictor for psychiatric readmission.

A significant weakness in this quality improvement project was the participant

size. A sample size of 96 participants was able to provide some useful data, a larger

sample size would have provided greater reliability and validating statistical results. Completing a retrospective chart review did present some challenges in the data collection as patient charts were incomplete making it difficult to collect consistent data from patients. Other challenges presented were in the variable, "days to readmission." In the data collection it was difficult to determine if patients were readmitted to other facilities. Another limitation was the diagnosis selection, only focusing on anxiety, depression, schizophrenia, bipolar and alcohol or substance use disorder created a limitation to the effectiveness of the READMIT tool.

Despite the challenges experienced in this quality improvement project, the data has provided strong implications for clinical practice and future project developments. For example, utilizing the already established electronic medical records. This system has the capability to add additional safeguards that will trigger providers during patient admission and discharges to ensure those that were flagged as moderate to high risk for readmission by their READMIT score have the necessary medications and follow-up to prevent or decrease 30-day readmission.

Further implications encourage a more individualized plan of care and follow up. Though patients may have similar or the same READMIT scores the variables that make this so will differ. For example, if two patients have a readmit score of 22, one patients score of 22 may be connected to psychosocial contributors while the second patient's score may be contributed to medication adherence. Having this type of scoring system will urge providers to become more cognizant of how these patients are managed and what can be done to decrease 30-day readmissions.

Conclusion

  This quality improvement project was able to determine that the READMIT tool can predict readmission into an inpatient psychiatric facility within 30 days. It was also able to provide a gateway for further clinical studies, management, and clinical practice. The READMIT index did show that certain risk factors contributed to a higher READMIT score, making these individuals more likely to be readmitted within 30 days. Tools like these have the potential to enhance psychiatric treatment and provide greater medical and social support as it can identify individuals who are at a higher risk for 30-day readmission.

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Appendix A

Table 1. Boolean Methods

Content Area†	Subject Heading†	Search Terms†
Nursing	Psychiatric Nursing Mental Health Nursing	education training nurse led prevention intervention
Mental Health Disorder	Mental Health Statistics	cost, rates, diagnosis, statistics, psychiatric illness, mental health, adults
Readmission	Acute Inpatient psychiatric	unplanned readmission rates, 30-day, patient outcomes, pre-discharge, post discharge
Screening Tool	READMIT Clinical Index	risk model, guidelines, predictors, screening, READMIT clinical risk index

†Boolean methods AND with OR were used

Appendix B

IRB Approval Letter

SSMSTL IRB
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NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE:	December 16, 2021
TO:	Faulkner, Victoria, Nursing
	Reid, Roxanne, Nursing
FROM:	Villaflores, Herbert, MD, SSMSTL IRB
PROTOCOL TITLE:	Quality Improvement: Identifying Risk Factors to Reduce 30-day Psychiatric Readmissions into an Acute Inpatient Facility through the Utilization of the READMIT Clinical Risk Index
FUNDING SOURCE:	NONE
PROTOCOL NUMBER:	21-11-2309
APPROVAL PERIOD:	Approval Date: December 15, 2021 Expiration Date: December 14, 2022

The Institutional Review Board (IRB) has reviewed and approved the protocol submission and the pertinent attachments listed in the Event history for protocol 21-11-2309-NEW titled Quality Improvement: Identifying Risk Factors to Reduce 30-day Psychiatric Readmissions into an Acute Inpatient Facility through the Utilization of the READMIT Clinical Risk Index, in accordance with the SSMSTL Human Research Protection Program. The approval is issued under SSM Health Care - St. Louis Federalwide Assurance Number 00008120 issued by the Office for Human Research Protections (OHRP).

The protocol must be renewed on a yearly basis as long as the research remains active unless it is approved as an Exempt study. Should the protocol not be renewed before expiration, all activities must cease until the protocol has been reviewed and renewed by the IRB.

If you have any questions regarding your protocol or the IRB's action, please contact Tricia Lawlar or Diane Peasel.

Appendix C

READMIT Clinical Risk Index

Adopted from Vigod, S. N., Kurdyak, P. A., Seitz, D., Herrmann, N., Fung, K., Lin, E.,
Perlman, C., Taylor, V.H., Rochon, P. A., & Gruneir, A. (2015). READMIT: A clinical

Risk factor	Variable	Value	Points
"R" — Repeat admission (lifetime)	Number prior to index	0	0
		1 to 2	2
		3 to 5	5
		6 or more	7
"E" — Emergent admission	Threat to others	No	0
		Yes	1
	Threat to self	No	0
		Yes	1
	Unable to care for self	No	0
		Yes	2
"A" — Age	Age group (years)	Older than 94	0
		85 to 94	1
		75 to 84	2
		65 to 74	3
		55 to 64	4
		45 to 54	5
		35 to 44	6
		25 to 34	7
		18 to 24	8
"D" — Diagnosis and discharge	Primary diagnosis	Alcohol or substance	0
		Depression	2
		Psychosis or Bipolar	4
		Other	3
	Any personality disorder	No	0
		Yes	2
	Unplanned discharge	No	0
		Yes	5
"M" — Medical morbidity	Charlson comorbidity score[a]	0	0
		1 to 2	1
		3 or more	2
"I" — Intensity (past year)	Outpatient psychiatrist visits	Less than 2	0
		2 or more	2
	Emergency department visits	None	0
		1 or more	3
"T" — Time in hospital	Length of stay (Days)	More than 28 days	0
		15 to 28	3
		Less than 14	4
Total possible score			**41**

[a] For Charlson comorbidity score, assign 1 point each for previous myocardial infarction, cerebrovascular disease, peripheral vascular disease, diabetes; 2 points each for heart failure, chronic obstructive pulmonary disease, mild liver disease, any tumor (including lymphoma or leukemia); 3 points each for dementia, connective tissue disease; 4 points each for AIDS and moderate or severe liver disease; and 6 points for metastatic solid tumour.

Appendix C continued

READMIT Clinical Risk Index

Charlson Comorbidity Score-This is a continuation of the READMIT tool M (Medical Morbidity)

Condition	Score (Circle appropriate score)
Age	
$\leq$40	1
41-50	1
51-60	2
61-70	3
$\geq$71	4
Myocardial Infarction	1
Cerebrovascular Disease	1
Peripheral Vascular Disease	1
Diabetes	1
Heart Failure	2
Chronic Obstructive Pulmonary Disease	2
Mild Liver Disease	2
Any tumor (including lymphoma or leukemia)	2
Dementia	3
Connective Tissue Disease	3
AIDS	4
Moderate or Severe Liver Disease	4
Metastatic solid tumor	6

Appendix D

Permission to use READMIT Clinical Risk Index

Vigod, Dr. Simone <simone.vigod@wchospital.ca>
Sat 11/20/2021 4:46 PM
To: Faulkner, Victoria

WARNING: This message has originated from an External Source. This may be a phishing expedition that can result in unauthorized access to our IT System. Please use proper judgment and caution when opening attachments, clicking links, or responding to this email.

Hi Victoria,

The READMIT index is published, and you are welcome to use it as you wish for your academic pursuits.

Best,

Simone Vigod

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@simonevigod on twitter
https://www.womensresearch.ca/scientists/core-faculty/simone-vigod

Appendix E

Data Collection Sheet
Patient Demographic Variable Collection Form

Age			Days to Readmission		
Race			Gender		
American Indian or Alaska Native	1				
			Female	1	
Asian	2		Male	2	
Black or African American	3		Transgender Female	3	
Native Hawaiian or Other Pacific Islander	4		Transgender Male	4	
			Gender/Non-Conforming	5	
White	5				
			Primary Complaint		
Ethnicity					
Hispanic or Latino	1		Anxiety	1	
Non-Hispanic or Latino	2		Depression	2	
			Schizophrenia	3	
			Bipolar	4	
			Alcohol or Substance Use Disorder	5	
Housing Status at admission			Housing Status at discharge		
House	1		House	1	
Residential	2		Residential	2	
Houseless	3		Houseless	3	
Length of Stay			READMIT Score		
Insurance			Employment Status		
Yes	1		Employed	1	
No	2		Unemployed	2	

Appendix E continued

Data Collection Sheet
Patient Demographic Variable Collection Form

Substance Use Disorder			Education		
Current	1				
History	2		Beyond High School		1
			High School Diploma		2
TYPE:			Less than High School		3
ETOH	1				
Cocaine/Crack	2		Medications		
Cannabis	3		Discharged With	1	
Amphetamine	4		Discharged Without	2	
Benzodiazepine	5				
Opioids	6		Support System		
Other:	7		Family		
			Friends		
			Other		

Appendix F

Mental Health History

Mental Health Condition	N	%
Depression	53	55.2%
Anxiety	20	20.8%
Bipolar/ Schizophrenia	19	19.8%
Alcohol or Substance Misuse	4	4.2%
Total	96	100.0%
Substances	N	%
ETOH	13	13.5%
Cannabis	13	13.5%
Amphetamine	1	1.0%
Missing	69	71.9%
Total	96	100.0%
Housing Status at Admission	N	%
House	13	13.5%
Residential	83	86.5%
Total	96	100%
Housing Status at Discharge	N	%
House	13	13.5%
Residential	83	86.5%
Total	96	100%
Medication Status	N	%
Discharged With	45	46.9%
Discharged Without	51	53.1%
Total	96	100.0%
Support Systems	N	%
Family	58	60.4%
Friends	28	29.2%
Other	10	10.4%
Total	96	100.0%

Appendix G

Multicollinearity Statistics

	Tolerance	**VIF**
(Constant)		
Whether Participant is Black	0.92	1.08
Is Female	0.89	1.12
Age	0.39	2.56
Length of Stay	0.76	1.31
Has Anxiety	0.19	5.17
Has Depression	0.15	6.47
Is Bipolar	0.21	4.70
Has Residential Housing at Discharge	0.93	1.07
Discharged with Medication	0.61	1.63
Has Friend Support	0.87	1.14

Appendix H

Normality of Residuals

Histogram

Dependent Variable: Readmit Score

Mean = −3.34E−16
Std. Dev. = 0.945
N = 95
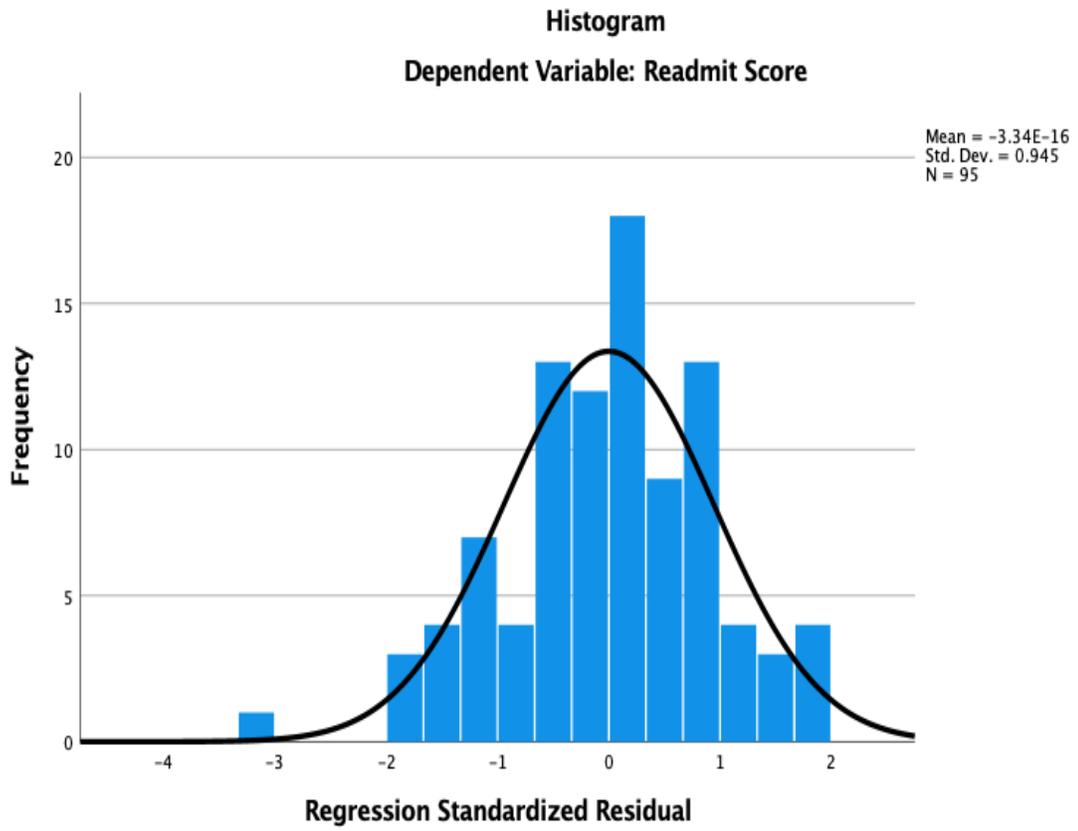
Appendix I

Homoscedasticity

Scatterplot

Dependent Variable: Readmit Score
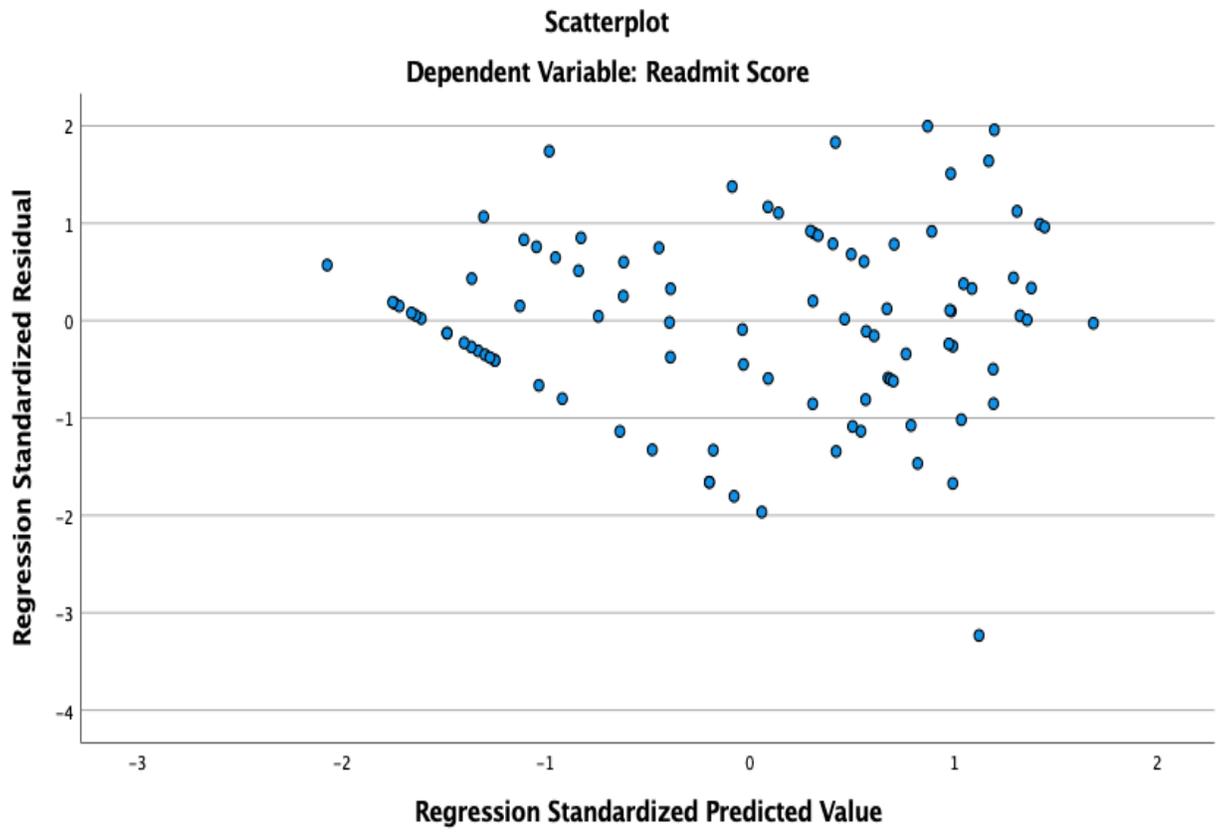
Appendix J

Multiple Regression Results

	B	SE	β	*t*	*p*
(Constant)	26.36	1.24		21.19	0.00
Whether Participant is Black	0.54	0.68	0.06	0.80	0.42
Is Female	-0.47	0.61	-0.05	-0.77	0.44
Age	-0.20	0.03	-0.73	-7.61	0.00
Length of Stay	0.00	0.04	-0.01	-0.14	0.89
Has Depression	-0.78	0.61	-0.09	-1.28	0.20
Has Residential Housing at Discharge	1.23	0.87	0.10	1.42	0.16
Discharged with Medication	-0.48	0.74	-0.06	-0.66	0.51
Has Friend Support	-0.12	0.63	-0.01	-0.20	0.84

*Note*s. *$p <.05$, **$p <.01$, ***$p <.001$