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Personal Recovery as a Protective Factor Against Suicide Ideation in Individuals with Schizophrenia

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Abstract

Suicide rates are elevated in individuals with schizophrenia, yet evidence is mixed regarding the roles of positive and negative symptoms as risk factors for suicide in this population, suggesting that there may be other influential variables. One such variable may be personal recovery. Therefore, the purpose of this study was to test the hypothesis that personal recovery would moderate the relationship between symptoms of schizophrenia and suicide ideation. This hypothesis was tested in sample of 169 individuals diagnosed with schizophrenia or schizoaffective disorder using a Poisson regression model. Results suggested that there was no significant interaction between recovery and symptoms of schizophrenia. However, recovery was a significant predictor of suicide ideation after controlling for psychiatric symptoms. These findings indicate that recovery is associated with lower suicide ideation and thus may protect against it. Thus, recovery should be assessed, and potentially intervened upon, to reduce suicide risk in individuals with schizophrenia.

Keywords

Positive symptoms; Negative symptoms; Depression; Suicide; Recovery

Introduction

Suicide rates are markedly elevated among individuals with schizophrenia (Gomez-Duran et al., 2012; Hawton et al., 2005), and a significant number of individuals with schizophrenia will experience suicide ideation (i.e., thoughts of ending one's life or killing one's self [Posner et al., 2011], an important risk factor for death by suicide [Hor and Taylor, 2010; Kasckow et al., 2010]) in their lifetimes (Montross et al., 2005). Additionally, both positive

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and negative symptoms of schizophrenia have been linked to suicide risk, though findings have been mixed regarding their roles as risk or protective factors (e.g., Gomez-Duran et al., 2012; Hor and Taylor, 2010).

For example, literature reviews have identified both positive correlations between positive symptoms and suicide risk (Gomez-Duran et al., 2012; Hor and Taylor, 2010) and negative correlations between positive symptoms and suicide risk (Hawton et al., 2005). Similarly, reviews have found inverse relationships between negative symptoms and suicide risk (Hor and Taylor, 2010) or no relationships between these variables (Hawton et al., 2005). Studies have also observed a positive relationship between suicide risk and negative symptoms (Tarrier et al., 2004; Umut et al., 2013; Yan et al., 2013). The inconsistent findings do not appear to be dependent on the suicide-related outcome of interest (e.g., ideation, attempts, death).

Similarly, other psychiatric symptoms may also confer suicide risk in individuals with schizophrenia. Jovanovic et al. (2013) found that anxiety was associated increased suicide risk, defined as previous suicide attempts and/or current suicide ideation. Depressive symptoms have also been associated with suicide risk (Jovanovic et al., 2013), as well as previous suicide attempts (Umut et al., 2013) and suicide ideation (Umut et al., 2013; Yan et al., 2013) separately. Therefore, it is important to account for psychiatric symptoms such as depression and anxiety when examining predictors of suicide risk in individuals with schizophrenia.

Collectively, these findings indicate that relationships between positive symptoms, negative symptoms, and suicide ideation are not clear and suggest that there may be unmeasured variables influencing these relationships. However, little research to date has examined interactive effects of risk and protective factors on suicide ideation in individuals with schizophrenia; a majority of the research has focused on identifying individual risk factors, absent the context of interactions with other variables. The inconsistent results to date suggest that examining such interactions may be critical to better understanding suicide risk among individuals with schizophrenia.

One such factor, which has received increasing attention in the literature, clinical practice, and policy initiatives, is recovery. While some have defined the concept of recovery in terms of symptom remission or return to premorbid functioning, there is a growing recognition that recovery may involve more than this (Bellack, 2006; Substance Abuse and Mental Health Services Administration [SAMHSA], 2012). The consumer model of recovery suggests that recovery is a process rather than an outcome, involving the development of self-efficacy, self-agency, self-direction, hope, and empowerment (see Bellack, 2006 for more information on models of recovery). Based on SAMHSA's (2012) definition, recovery is, "a process of change through which individuals improve their health and wellness, live a self-directed life, and strive to reach their full potential" (p. 3). Personal recovery has been associated with psychiatric symptoms, medication use, service use, and functional outcomes (Green et al., 2013), as well as social support (Thomas et al., 2015). More specifically, greater endorsement of domains of personal recovery (e.g., hope, empowerment) has been linked to

lower depressive symptoms, fewer alcohol problems, fewer reported medication side effects, and use of crisis intervention services (Resnick et al., 2004).

To date, no studies have specifically examined the construct of personal recovery in relation to suicide risk, though recovery may be an important protective factor against suicide in individuals with schizophrenia. However, research provides indications that features related to the construct of personal recovery may be protective against suicide ideation. For example, Chang et al. (2014) found that greater hopelessness (similar to hope) and lower internal locus of control (similar to self-direction and responsibility) each predicted suicide ideation in individuals with first episode psychosis. Gale and colleagues (2012) examined the relationship between stage of recovery and suicide ideation in individuals with schizophrenia and also found support for a relationship between recovery and reduced suicide ideation in the past year. Additionally, research has shown that internalized stigma, which may influence recovery through effects on hope, respect, and strengths, is associated with greater suicide ideation among individuals with schizophrenia (Sharaf et al., 2012). Collectively, these studies indicate that topics closely related to recovery are linked to suicide ideation, lending indirect support for recovery as a protective factor. The consistent nature of these findings may also suggest recovery is more important or proximal than commonly-examined risk factors (e.g., positive symptoms, negative symptoms) that are less consistently associated with suicide risk.

Given the findings to date, it is plausible that recovery may be an important predictor of suicide ideation, and may also interact with the severity of positive and negative symptoms to influence suicide ideation. Such an interaction may account for the conflicting findings regarding symptoms and suicide risk when recovery is not included in the models.

Therefore, we generated the following hypotheses:

1. Recovery would be a significant concurrent predictor of suicide ideation when included in a model with positive symptoms and negative symptoms of schizophrenia.
2. Recovery would moderate the relationship between positive symptoms and suicide ideation.
3. Recovery would moderate the relationship between negative symptoms and suicide ideation.

For Hypotheses 2 and 3, we anticipated that the direction of these interactions would indicate that individuals with strong recovery would report the lowest suicide ideation regardless of symptom severity. Conversely, we anticipated that, among individuals with low recovery, more severe symptoms would be associated with higher suicide ideation.

Methods

Participants

Participants were 169 individuals who had been recruited to take part in a larger study and who completed the study protocol. All participants had been diagnosed with a schizophrenia spectrum disorder (i.e., schizophrenia or schizoaffective disorder). The sample used for the

current study was a subsample of participants enrolled in the larger study ($N = 250$), which also included individuals with other serious mental illness diagnoses (e.g., bipolar disorder), who were excluded because some of the variables of interest (i.e., positive and negative symptoms of schizophrenia) were not relevant to these diagnoses. Participants were 25 to 65 years of age, all were enrolled in mental health services and receiving treatment as usual, and they varied significantly in time since diagnosis and stage of illness. Participants were excluded from study enrollment if there was evidence of severe or profound intellectual disability. See Drapalski et al. (2016) for additional details.

Procedures

The study was approved by the appropriate Institutional Review Boards. Participants were recruited from two Veterans Affairs Medical Centers and one community mental health center after referral by a mental health treatment provider, review of clinic rosters, or self-referral based on flyers posted at the recruitment sites; this was a convenience sample. All participants provided informed consent prior to study participation, and participants were compensated for their time. Participants completed a baseline assessment, which included all measures used in the current study; this assessment was completed in approximately three hours in total and also included other measures that were not included in the current study. The current study is a secondary analysis of data collected for a larger cross-sectional survey study validating a measure of recovery. Hypotheses were generated after all data were collected. Additional information regarding recruitment and procedures is available in Drapalski et al. (2016).

Measures

Brief Symptom Inventory—(BSI; Derogatis and Melisaratos, 1983). The BSI contains 53 self-report items that evaluate a variety of psychological symptoms, which can be grouped into subscales assessing various domains (e.g., depression, anxiety). Items are rated based on the amount of distress they have caused in the past week using a 5-point Likert-type scale, with higher scores indicative of more severe symptoms, and these ratings are then averaged to provide subscale scores. Upon initial validation, reliability and validity indicators were strong (Derogatis and Melisaratos, 1983); this measure has been well-validated in individuals with serious mental illness (e.g., Hoe and Brekke, 2008; Long et al., 2007). In the current study, one item (“Thoughts of ending your life”), rated on a 5-point scale, was used as the suicide ideation outcome measure. Additionally, the anxiety subscale (six items) and depression subscale (seven items with the suicide ideation item removed, resulting in six items on this subscale) were included as covariates in the analysis. The possible range of scores for the suicide ideation item and each subscale is 0 to 4, as items are averaged.

Positive and Negative Syndrome Scale—(PANSS; Kay et al., 1987). The PANSS is a 30-item interviewer-administered assessment of symptoms associated with schizophrenia, rated on a 7-point scale based on severity within the past week; higher scores represent more severe symptoms. Recent findings suggest that the items best fit into five subscales: positive symptoms, negative symptoms, disorganized symptoms, excited symptoms, and depressive symptoms; these subscales have been validated in multiple samples (Stefanovics et al., 2014;

Wallwork et al., 2012). Given the strong evidence for the five-factor model, we used the revised positive symptoms (4 items, possible range of 4 to 28) and negative symptoms (6 items, possible range of 6 to 42) subscales for analysis. The psychometric properties for these subscales have been demonstrated to be good (Stefanovics et al., 2014; Wallwork et al., 2012). In the current sample, Cronbach's alpha was 0.73 for the positive symptoms subscale and was 0.69 for the negative symptoms subscale.

Maryland Assessment of Recovery in People with Serious Mental Illness—

(MARS; Drapalski et al., 2012; Drapalski et al., 2016). The MARS is a 25-item self-report measure of recovery in which participants select a response on a 5-point Likert-type scale based on how much they agree with each statement. Possible scores range from 25 to 125, with higher scores indicating better recovery. This measure was designed to assess multiple components of recovery based on the SAMHSA definition of recovery (e.g., holistic, strengths-based, responsibility, hope). Participants' responses are summed for a total score reflecting their beliefs about their own recovery from serious mental illness; this total score was used for analysis. In the initial validation study, the MARS evidenced strong internal consistency and test-retest reliability (Drapalski et al., 2012); associations with functional outcomes over time also suggest acceptable construct validity (Thomas et al., 2015), and psychometric properties in other samples are good (Ahmed et al., 2013). Internal consistency reliability in the current sample was excellent (Cronbach's $\alpha = 0.95$).

Data Analysis

Data were analyzed using a regression model, with the BSI suicide ideation item entered as the outcome variable; MARS total score, PANSS positive symptoms subscale score, PANSS negative symptoms subscale score, and interaction terms entered as predictor variables; and BSI depression subscale score, BSI anxiety subscale score, and level of education entered as covariates to control for variance associated with them prior to inclusion of variables of interest in the model. Covariates were selected based on significant correlations with the outcome variable, as well as previous research establishing depression and anxiety as important risk factors for suicide ideation (e.g., Jovanovic et al., 2013; Yan et al., 2013). Because the BSI suicide ideation item evidenced substantial right skew, a Poisson regression was used (Coxe et al., 2008). The Poisson regression model fit the data acceptably (Pearson $\chi^2/df = 1.14$).

Prior to analysis, univariate outliers were corrected and a multivariate outlier was removed. Additionally, there was skew evident in both PANSS subscale scores, so these scores were log-transformed. Log-transformed PANSS subscale scores and MARS total scores were centered, then multiplied to create interaction terms to examine moderating effects of recovery on the relationship between symptoms and suicide ideation.

Results

Demographic information is presented in Table 1. Briefly, our sample was predominantly male (87.5%), black (75.4%), never married (58.9%), and unemployed (88.1%). The gender and racial profile of the sample was generally representative of the population in the geographic areas in which this study took place. Correlations and descriptive statistics,

including mean scores, standard deviations, and observed ranges, are presented in Table 2. Higher suicide ideation was significantly correlated with depressive symptoms ($r = .275$), anxiety symptoms ($r = .352$), positive symptoms of schizophrenia ($r = .226$), but not negative symptoms of schizophrenia ($r = .063$). Lower suicide ideation was significantly correlated with recovery ($r = -.220$). Recovery was also significantly correlated with lower negative symptoms of schizophrenia ($r = -.219$), but not with positive symptoms of schizophrenia ($r = -.145$).

Results of the regression analysis indicated that, before including interaction terms, positive and negative symptoms were not significant predictors of suicide ideation after controlling for depressive and anxious symptoms (see Table 3); depressive symptoms were also not a significant predictor, though anxious symptoms were. Consistent with Hypothesis 1, recovery was a significant predictor after controlling for depressive, anxious, positive, and negative symptoms (see Table 3). Effects of predictors were interpreted prior to interaction terms being entered into the model, as the interaction terms include the same variables in the model again and therefore account for some of the same variance as the predictors, making the effects less meaningful. When interaction terms were added to assess Hypotheses 2 and 3, neither the interaction between positive symptoms and recovery ($b = .098$, $p = .165$), nor the interaction between negative symptoms and recovery ($b = -.099$, $p = .164$) was significant.

To make the unstandardized beta coefficient interpretable, as Poisson analysis uses a log-link, incidence rate ratios (IRRs) are used (IRR formula: e^b ; Cox et al., 2008; Schofer, 2010). IRRs are analogous to relative risk ratios and, in the case of rare outcomes like suicide, odds ratios. A relative risk ratio or IRR calculates the risk or rate of an outcome (e.g., suicide ideation) in individuals exposed to a predictor variable compared to the risk or rate of the outcome in individuals not exposed to the predictor variable. In the case of continuous predictor variables (e.g., recovery), exposure is not binary but is based on the level of exposure (e.g., each 1-point increase in score). The IRR for recovery was 0.97 ($e^{-0.029} = 0.971$), suggesting that for each one point increase in recovery scores, suicide ideation scores were multiplied by 0.97. Put in terms of percent change (Formula: $(e^b - 1) * 100$), for every one point increase in recovery, suicide ideation decreased by nearly 3% ($((e^{-0.029} - 1) * 100 = -2.86\%)$). While the effect may seem relatively small, taken in the context of the observed range of scores on the recovery measure (87 points), it is quite large. The effect means that, in our sample, the participant who scored the most highly on the MARS (score of 125) would be expected to report 0.08 (formula: 0.971^{87}) times the suicide ideation reported by participant with the lowest score on the MARS (score of 38).

The IRR for anxiety was 2.05, indicating a change of 105.2% in suicide ideation with each one point change in anxiety. Because the range on anxiety scores is much smaller (minimum score of 0, maximum score of 4 in our sample) and the beta coefficients are unstandardized, the effect of anxiety is generally comparable to the effect of recovery in the model. The lowest score on anxiety in our sample was associated with .06 (formula: $1/(2.052^4)$) times the suicide ideation when compared to the highest score on anxiety.

Discussion

The main findings from this study implicate recovery as an important protective factor against suicide ideation in individuals with schizophrenia. Specifically, this is the first study to our knowledge that has examined the relationship between personal recovery and suicide ideation in schizophrenia. We found that suicide ideation is less prevalent among individuals with schizophrenia that self-report greater recovery; in fact, our model suggests that suicide ideation among individuals with the lowest recovery would be over 10 times greater than among those with the highest recovery. Contrary to our hypothesis, recovery did not moderate the relationship between either positive or negative symptoms and suicide ideation. However, the relationships between suicide ideation and recovery, as well as anxiety and recovery, were significant in the model; positive symptoms, negative symptoms, depressive symptoms, and education were not significant predictors.

Given the particularly high rates of suicide among individuals in the early stages of illness (Gomez-Duran et al., 2012), it would be of particular interest if recovery-oriented approaches, such as the Recovery After an Initial Schizophrenia Episode programs (Essock et al., 2015; Lieberman et al., 2013; Mueser and Cook, 2014), can reduce subsequent suicide risk. Additionally, for individuals with a longer time since diagnosis, enhancing personal recovery may also be beneficial. For example, working with individuals to enhance self-efficacy regarding goals, increase hope for the future, and focus on strengths as a way to reach goals may reduce suicide risk.

Interestingly, anxiety symptoms were also a strong predictor of suicide ideation; however, depressive symptoms were not. While anxiety has been linked to suicide risk in schizophrenia (e.g., Hor and Taylor, 2010; Jovanovic et al., 2013; Lyu and Zhang, 2014), the effect is generally not as strong as the effect of depression. Our findings may be due to the smaller range on depressive symptoms in this sample, as one of the depression subscale items (i.e., suicide ideation) was removed prior to analysis. Alternatively, as our sample was predominantly made up of veterans, and veterans have a higher prevalence of anxiety-related disorders (i.e., posttraumatic stress disorder; Gradus, 2014), anxiety may be elevated in this population and therefore a stronger predictor of suicide ideation.

The strong relationship between recovery and suicide ideation aligns well with previous research, which has identified associations between variables similar to recovery (e.g., hopelessness, locus of control, stage of recovery, internalized stigma) and suicide risk in individuals with schizophrenia or psychosis (Chang et al., 2014; Gale et al., 2012; Sharaf et al., 2012), and may provide a broader context for these findings, in that these variables are included in the consumer model of recovery. Our findings also fit well with a common theory of suicide in schizophrenia, the demoralization hypothesis (Drake et al., 1985). This hypothesis states that individuals with schizophrenia may experience demoralization and hopelessness due to multiple symptom exacerbations and deteriorations in functioning. Recovery, which includes features such as hope, strengths-based, and empowerment, may protect against such demoralization, which may lead to lower suicide ideation.

Numerous other variables that were outside the scope of this study have been linked to suicide risk in schizophrenia. For example, some evidence has suggested that illness insight may be associated with increased suicide risk in individuals with schizophrenia (Lopez-Morinigo et al., 2012) and insight may play a role in demoralization (Drake et al., 1985). While insight has not been identified as a component of recovery (Bellack, 2006; SAMHSA, 2012), it may play a role in the relationship between recovery and suicide risk, as insight may be important in constructs such as hope and empowerment. Future studies should examine how insight influences relationships between recovery and suicide risk.

Limitations of this study include measurement, generalizability, and cross-sectional design. Interpretation of causal relationships between variables of interest in this study, particularly suicide ideation, recovery, and symptom severity, is limited by the cross-sectional design. This study also utilized a single-item measure of suicide ideation, which may limit reliability. Further, the measure did not assess for suicide attempts, which may exhibit distinct relationships with recovery and clinical variables. Use of structured assessments such as the Columbia Suicide Severity Rating Scale (Posner et al., 2011) in the context of a prospective study of recovery may simultaneously address these methodological limitations. Additionally, given that our participants were predominantly male, black, unmarried, unemployed, and Veterans, our findings may not generalize to samples with other characteristics. Race and gender may influence personal recovery as they play into culture and expectations regarding mental illness; therefore, assessing the role of recovery in reducing suicide ideation across races, genders, and cultures is an important area for future research.

Conclusions

The risk for suicide among individuals with schizophrenia far surpasses that found in the general population, and has been related to numerous clinical and socioenvironmental factors (Gomez-Duran et al., 2012; Hawton et al., 2005). Because of the complexity of this problem, it would be very clinically useful to identify potentially modifiable factors that reduce suicide risk. Our findings support the notion that recovery may reduce the risk for suicide ideation, which, in turn, could reduce the overall rate of suicide in this population and reduce the economic burden of suicide. Our findings also highlight the distinction between personal recovery and symptom remission, as personal recovery may be protective against suicide ideation regardless of symptom severity. Thus, interventions or programs specifically aimed at promoting recovery among individuals with schizophrenia may help to reduce suicide risk in this group. Based on the present findings, we also recommend that intervention studies examining recovery-oriented treatments include suicide ideation and suicidal behavior as key clinical outcomes.

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Table 1

Sample Demographic Information

Demographic Characteristic		n (%)
Gender	Male	147 (87.5%)
	Female	22 (12.5%)
Employment	Unemployed	149 (88.1%)
	Employed (paying job)	20 (11.9%)
Living arrangements	Unsupervised	117 (69.7%)
	Supervised	43 (26.5%)
	Temporary residence/shelter	6 (3.6%)
Veteran status	Homeless	2 (1.2%)
	Veteran	134 (79.8%)
	Non-Veteran	35 (20.2%)
Marital Status	Single/Never married	99 (58.9%)
	Divorced	49 (29.2%)
	Married	14 (8.3%)
	Widowed	6 (3.6%)
Ethnicity	Not of Hispanic/Latino origin	163 (96.4%)
	Of Hispanic/Latino origin	6 (3.6%)
Race	African-American	126 (75.4%)
	White	24 (14.4%)
	Multiracial	15 (9.0%)
	Asian	1 (0.6%)
	American Indian/Alaskan Native	1 (0.6%)
Demographic Characteristic		M (SD)
Age		51.92 (8.51)
Years of Education		12.51 (1.89)
Number of children		1.54 (2.00)

Table 2

Descriptive Statistics and Correlations

	1	2	3	4	5	6	7	8
1. Age	---							
2. Education	.102	---						
3. Depression	-.135	.028	---					
4. Anxiety	-.094	-.070	.736***	---				
5. Recovery	.053	.004	-.433***	-.291***	---			
6. Positive symptoms	-.106	-.081	.263**	.275***	-.145	---		
7. Negative symptoms	.002	.083	.164*	.108	-.219**	-.035	---	
8. Suicide ideation	-.016	-.049	.275***	.352***	-.220**	.226**	.063	---
Mean	51.92	12.51	1.21	1.00	96.60	9.30	11.05	0.17
Standard Deviation	8.51	1.89	1.05	0.90	18.12	4.20	4.32	0.51
Observed Range	25–65	6–20	0–4	0–4	38–125	4–22	6–24	0–3

Note:

* $p < .05$;** $p < .01$;*** $p < .001$.

Depression measured by the Brief Symptom Inventory depression subscale with suicide ideation item removed; Anxiety measured by the Brief Symptom Inventory anxiety subscale; Recovery measured by the Maryland Assessment of Recovery in People with Serious Mental Illness total score; Positive Symptoms measured by the Positive and Negative Syndrome Scale positive symptoms subscale; Negative Symptoms measured by the Positive and Negative Syndrome Scale negative symptoms subscale; Suicide ideation measured by the Brief Symptom Inventory item 9. Non-transformed/centered scores presented in this table.

Table 3

Poisson Regression Model Predicting Suicide Ideation

Variable	b	SE	Wald χ^2	p	IRR
Intercept	-3.558	0.691	26.545	.000	0.028
Education	0.659	0.413	2.549	.110	1.933
Depression	-0.329	0.299	1.212	.271	0.720
Anxiety	0.719	0.285	6.376	.012	2.052
Positive Symptoms	2.130	1.257	2.872	.090	8.415
Negative Symptoms	0.548	1.285	0.182	.670	1.730
Recovery	-0.029	0.012	6.300	.012	0.971

Note: SE: Standard error; IRR: Incidence rate ratio; Suicide ideation measured by the Brief Symptom Inventory item 9; Depression measured by the Brief Symptom Inventory depression subscale (with suicide ideation item removed); Anxiety measured by the Brief Symptom Inventory anxiety subscale; Positive Symptoms measured by the Positive and Negative Syndrome Scale positive symptoms subscale (centered prior to analysis); Negative Symptoms measured by the Positive and Negative Syndrome Scale negative symptoms subscale (centered prior to analysis); Recovery measured by the Maryland Assessment of Recovery in People with Serious Mental Illness total score (centered prior to analysis).