

# Assessing the Quality of Patient Responses to a Psychosocial Intervention Implemented on an Adolescent Psychiatric Inpatient Unit: Devising the Safety Plan Quality Metric

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## ABSTRACT

The Safety Planning Intervention (SPI) helps patients use coping strategies when in a suicidal crisis. This project aimed to characterize SPI quality and determine if it is associated with reduced risk of readmission to psychiatric hospitals. The sample included 145 participants hospitalized on an adolescent psychiatric unit from May to December 2018 who met suicidal criteria per items 18 and 91 on the Youth Self Report. The Safety Plan Quality Metric was created to rate SPI quality. A significant association between higher-quality SPI and fewer instances of readmission was identified ( $X^2 (1, N = 94) = 4.32, p = .038$ ). A logistic regression conducted to determine the impact of other patient factors on readmission did not yield a statistically significant model, ( $X^2 (5, N = 94) = 8.43, p = 0.13$ ). The results suggest that patients with higher quality SPIs were less likely to be rehospitalized.

**KEYWORDS:** Safety Planning Intervention, suicide prevention, adolescent, inpatient psychiatric hospitalizations

## INTRODUCTION

The rate of suicide among adolescents has markedly increased in the last decade.<sup>1</sup> While there are inpatient treatments for suicidality, patients admitted for mental health conditions are frequently readmitted, with readmission rates as high as 8% within the first month post-discharge.<sup>2</sup> Moreover, the lengths of hospitalizations are shorter – making the imperative for effective yet brief interventions more urgent.<sup>3</sup> Such interventions do now exist – including the SPI which was first conceived of with adolescent populations in the context of Cognitive Behavioral Therapy. The SPI allows patients to identify their coping strategies, sources of support, and methods of means restriction in a time of suicidal crisis.<sup>4</sup> Subsequently, the SPI was adopted as a brief Emergency Department intervention with veteran populations and has since been officially termed the SPI.<sup>5</sup>

Since its inception, the SPI has been adopted by hundreds of healthcare organizations and has been deemed comparable to other standardized brief health interventions such as counseling on smoking cessation.<sup>6</sup> Although the pervasive

adoption of the SPI is encouraging, few studies assess the quality of the SPI the patient completes. One study conducted in the Veterans Health Administration (VHA) with adults noted that there was significant variability in the quality of the SPI amongst a cohort of veterans.<sup>7</sup> Therefore, there is a need for an assessment of this variation in the quality of the SPI on patient outcomes. The goals of this study were two-fold – to devise a standardized quality metric that objectively rates the quality of the SPI completed by the patient, and to use this metric to determine the impact of the SPI quality on the clinical outcome of readmission to the psychiatric hospital within 6 months from discharge from the hospital stay during which the SPI was completed. We hypothesized that higher quality SPI was associated with fewer readmissions to the psychiatric hospital.

## METHODS

This study was conducted using data from the adolescent inpatient unit of a pediatric psychiatric hospital in the Northeast as part of a broader study that was approved by the hospital IRB. The patients from the dataset were hospitalized at Bradley Hospital from May to December 2018. A total of 145 patients met suicidal criteria per item 18 and 91 on the Youth Self Report.<sup>8</sup>

## Participants

Within this larger dataset, patient demographics and variables such as sex assigned at birth, age at hospitalization, and total score on the Suicidal Ideation Questionnaire (SIQ)<sup>9</sup> upon admission were included. A chart review was conducted to identify the race and ethnicity of each of the patients. These patient demographics and SIQ scores were included to control for patient factors that could impact readmission to the hospital other than the quality of the SPI given that the severity of suicidal thoughts and patient demographics may influence readmission.<sup>10-12</sup> The majority of participants were assigned female at birth (72.22%) with a mean age of 14.67 (standard deviation [SD] = 1.76). Of note, 70.14% of the participants were listed as "White or Caucasian," 6.94% as "Black or African American," 1.39% as "Asian," and the remainder as either "Other," "Other, White or Caucasian," "Unknown," or "Patient refused," in the EHR. In terms of ethnicity, 19.44% were listed as "Hispanic or Latino," in the

EHR. For subsequent analyses, the patient's race and ethnicity was dichotomized into a minoritized variable whereby 1 signified either that patient's race was anything but "White or Caucasian," or that their ethnicity was listed as "Hispanic or Latino", and 0 signified both that the patient's race was listed as "White or Caucasian," and that their ethnicity was listed as "Not Hispanic or Latino," in the chart. In terms of severity of suicidal ideation, 63.19% of participants had a score of 41 or higher on the SIQ, a commonly utilized clinical cutoff for severity of suicidal ideation.<sup>13</sup>

### Safety Planning Intervention

The SPI completed during hospitalizations from May 2018 to December 2018 was retrieved from each patient's EHR (see **Appendix A** for a blank safety plan). At the point of this study, the SPI was completed by the patient in collaboration with the milieu staff or nurse. The psychiatrist or psychologist would review the SPI and help the patient to finalize it. All medical staff (psychiatrists and psychologists), milieu staff and nurses who assist with SPI are specifically trained in SPI before implementing. The training has been integrated into on-line training modules and into on-the-unit training with observation and feedback by senior staff. Which medical provider/staff member helped a patient fill out an SPI was not indicated in the chart. If an SPI was located for a patient, it was printed, and any Protected Health Information (PHI) was redacted. If an SPI could not be found for a patient's hospitalization in the EHR, this was assumed to imply that the patient did not fill out an SPI during that hospital stay and it was noted that there was no SPI completed for that patient.

### Safety Plan Quality Metric

Subsequently, a metric (Safety Plan Quality Metric, see **Appendix B**) was created to measure the quality of the SPI for each patient. The metric was based on the Safety Plan Intervention Rating Scale and the Cognitive Therapy Rating Scale.<sup>14,15</sup> The metric was revised a total of four times before it was used to code the SPI. In order to test each revision of the metric, a total of nine safety plans that were not included in the dataset of 145 participants were used as "pilot" safety plans to test the metric. These nine safety plans were from the larger dataset the 145-patient sample originally came from but were outside the date range. In summary, the Safety Plan Quality Metric functioned to rate the quality of each SPI based on completeness, specificity, and relevance. Additionally, a coding manual (see **Appendix C**) was iteratively revised twice based on feedback from a panel of psychology residents in training on the unit.

In the final version of the Safety Plan Quality Metric, each section of the SPI could receive a score of either 0,1,2,3 or 4. The SPIs that were coded had a total of 6 sections but only Sections 1,2,3,4 and 5 were coded. Section 6 (reason to live section) was not coded because this section invites more

"free-form" responses, and we chose not to examine these as part of this initial project. Therefore, each SPI could receive a maximum total score of 20 (since each of the 5 sections were coded and each section could receive a maximum score of 4). For each SPI, the coders both gave each section of the SPI a score as well as a total score which reflected the sum of scores across the five sections of the SPI.

### Scoring of SPI Quality

Once the Safety Plan Quality Metric was finalized, two coders scored each section of each SPI according to the Safety Plan Quality Metric, using the Coding Manual as a guide. After scoring was complete, the Individual Interclass Correlation Coefficient (ICC) was calculated for a two-way random-effects model using the statistical software STATA version 15.1 (StataCorp, College Station, Texas). Following the ICC calculation, the mean score for each section of each SPI across both coders was calculated creating a composite score reflective of the score given by both coders. Consequently, the mean composite score across all sections was calculated for each SPI. This mean composite score across sections was used in the subsequent data analyses.

Prior to conducting statistical analyses, the mean composite score across sections for each SPI was dichotomized into a high-quality (score of 1) or low-quality (score of 0) variable on STATA. For each SPI, a score of 3 or higher was categorized as high-quality and a score of 2 or below was categorized as low-quality. This cut-off was informed by clinical reasoning. Given that a score of 4 on the Safety Plan Quality Metric was defined as the "gold standard," while a score of 3 signified that the content of that filled out section both met the rationale and had at least 2 specific items, it seemed appropriate to designate scores of 3 or higher as high-quality.

In order to assess the effect of higher quality SPI on patient outcome, we examined re-hospitalization as a measure of patient outcome. During the initial chart review, for each participant, this writer identified any re-hospitalization to the inpatient psychiatric hospital within six months of the date the patient was discharged.

## RESULTS

We first calculated the ICC amongst the two coders who scored each SPI. The ICC was 0.83, which indicates good reliability between the two coders.<sup>16</sup> Of the 145 patients that met suicidal criteria on the Youth Self Report, the data from two patients could not be used. One, because the medical record number for the patient was incorrectly listed in the database, and the other, because the SPI was illegible. A total of 65.97% (N=95) of the patients had completed an SPI. The next step in our analysis was to determine how many of the completed and legible SPI could be classified as a high- or low-quality SPI according to the quality variable explained previously. 57.45% (N=54) of SPIs were classified

**TABLE 1.** Summary of Logistic Regression Model Predicting Readmission to Bradley Hospital Within 6 Months of Discharge

Predictor	OR	P> z	95% CI		Prob > $\chi^2$
					0.1343
Minoritized status	1.064011	0.906	.3792161	2.98541	
Sex assigned at birth	0.8921205	0.424	.6742401	1.180409	
Age	0.683082	0.476	.239351	1.949442	
Total SIQ score	0.9847021	0.114	.9660465	1.003718	
Quality	0.3886062	0.049*	.1514929	.9968436	

as high-quality SPIs. Ultimately, we investigated the relationship between higher quality SPIs and re-hospitalization. Indeed, a chi-square analysis revealed a significant association between high-quality SPI and readmission  $\chi^2(1)=4.32$ ,  $p = .038$ . Of adolescents who had high-quality SPIs (rated for completeness, specificity, and relevance), 20.37% ( $N=11$ ) were readmitted compared to 40.00% ( $N=16$ ) of patients with SPIs of low quality. A logistic regression was conducted to determine the impact of age, sex assigned at birth, minoritized status per chart review, and severity of suicidal ideation (using total score on SIQ as a marker) in addition to high-quality SPI on readmission. The results of the logistic regression model were such that the model was not statistically significant,  $\chi^2(5, N = 94) = 8.43$ ,  $p = 0.13$  (see **Table 1**).

## DISCUSSION

Previous literature has emphasized the importance of the SPI, resulting in the adoption of SPI as a gold standard for treatment for those presenting with suicidal ideation. Importantly, this study reiterates the feasibility of the SPI as a brief psychiatric inpatient intervention for the treatment of suicidality in adolescent inpatients. However, literature relating to the way in which the SPI is filled out by the patient, and how to rate the quality of the SPI each patient comes up with, is lacking. This study indicates that although there was variability in the quality of the SPI among patients, over half of the SPIs were of high quality. Additionally, our results suggest that the patients with higher-quality SPIs were less likely to be readmitted to an inpatient psychiatric facility within six months. The effect of high-quality SPIs on readmission rates illustrates the importance of the investment in the SPI. The findings of this study also suggest that there is merit to having a clinical team member vet the quality of the SPI with the patient before discharge, given the relationship of the SPI to the probability of re-admission. Thus, this study serves to encourage psychiatric organizations to continue using the SPI and also to ensure that the SPI is of high quality, for doing so can have a positive impact on the health of patient populations experiencing suicidality.

The lack of statistical significance of the model could be accounted for by myriad factors. Firstly, due to the limited

research available in this area, there is a lack of effect size estimates in the existing literature. Therefore, we were unable to conduct a proper power analysis to identify if there was adequate statistical power for a logistic regression model. Secondly, as will be discussed below, if some of the patient variables included represented more nuanced demographics, perhaps the model would have been significant. Given the complexity of factors influencing re-hospitalization, it is likely that other factors that are not included in the model are more robust predictors, such as adverse childhood events.<sup>17</sup>

## Limitations

This study was limited by its statistical power and the fact that the only measure of patient outcome was re-hospitalization to an inpatient psychiatric facility. Additionally, patients who may have been readmitted to a facility not using the same EHR of the study hospital's healthcare network are not accounted for. While this is a minority of patients given that the study hospital serves the majority of patients in this age range, the number of patients that were readmitted may be underestimated.

Moreover, given that at the time of data collection the SPI was still hand-written and subsequently had to be uploaded onto the chart, it is certainly possible that some patients did indeed complete an SPI, but it was never uploaded into the chart. Therefore, the number of completed SPIs could be higher than the 65.97% calculated in this study.

Additionally, the fact that there is variability in terms of which medical provider/staff aided the patient in filling out the SPI is not something this study could account for. It is certainly possible that the providers/staff members who help with the completion of SPI could influence SPI quality even though there was a clearly defined protocol for training and implementation of the SPI.

There are notable limitations to how patient demographics were included in this study. The sex assigned at birth does not in any way reflect the complexity and diversity of gender that patients can express. Moreover, given that sexual minority youths are at higher risk of attempting suicide,<sup>18</sup> having access to more nuanced gender and sexual identity variables would have been helpful. Had more nuanced gender and sexual identity variables been included in the logistic regression – a relationship between such variables, SPI quality and likelihood of readmission could have been captured. Race and ethnicity are other patient demographic variables in this study that didn't accurately reflect the diversity and nuance these variables inherently have. In this study these variables were limited to the way race and ethnicity are recorded in the EHR. In future studies, it would be more appropriate to have patients self-identify their race from a more diverse and nuanced list of categories.

## CONCLUSIONS

The preliminary results presented here suggest that high-quality SPI can be protective against readmission to an inpatient psychiatric hospital. However, further assessment of how other patient variables such as race, gender expression, and diagnoses may impact SPI quality is warranted.

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