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ORIGINAL RESEARCH

The Practice of Emergency Medicine

An investigation of clinical decisionmaking: identifying important factors in treatment planning for suicidal patients in the emergency department

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Abstract

Objective: We sought to evaluate the influence of several well-documented, readily available risk factors that may influence a psychiatric consultant's decision to admit an emergency department (ED) patient reporting suicidal ideation for psychiatric hospitalization.

Methods: We conducted a retrospective study of adult patients presenting to six affiliated EDs within Pennsylvania from January 2015 to June 2017. We identified 533 patients reporting current active suicidal ideation and receiving a complete psychiatric consultation. Socio-demographic characteristics, psychiatric presentation and history, and disposition were collected. Decision tree analysis was conducted with disposition as the outcome.

Results: Four of 27 variables emerged as most influential to decisionmaking, including psychiatric consultant determination of current suicide risk, patient age, current depressive disorder diagnosis, and patient history of physical violence. Likelihood of admission versus discharge ranged from 97% to 58%, depending on the variables considered. Post hoc analysis indicated that current suicide plan, access to means, lack of social support, and suicide attempt history were significantly associated with psychiatric consultant determination of moderate-to-high suicide risk, with small-to-medium effect sizes emerging.

Conclusions: Only a handful of variables drive disposition decisions for ED patients reporting current active suicidal ideation, with both high and low fidelity decisions made. Patient suicide risk, determined by considering empirically supported risk factors for suicide attempt and death, contributes the greatest influence on a psychiatric consultant's decision to admit. In line with American College of Emergency Physicians (ACEP) recommendations, this study accentuates the importance of using clinical judgment and adjunct measures to determine patient disposition within this population.

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1 | INTRODUCTION

1.1 | Background

Suicide rates are rising across the United States,[1] highlighting the need for increased research to inform prevention and intervention efforts among populations at high-risk for suicide. As 40.0% of individuals who die by suicide have visited an emergency department in the 12 months before death, with 28.0% having more than 3 visits,[2] patients presenting to the ED are likely at elevated suicide risk. Research suggests that 2.2%–11.6% of ED patients report current suicidal ideation,[3-5] a figure that is higher than cross-national reports within the general adult population,[6,7] likely on the rise,[8] and, furthermore, underestimated.[9] Consequently, there is a need for the evaluation of clinical decisionmaking surrounding the presentation of suicidal individuals to the ED.

1.2 | Importance

Emergency physicians receive minimal psychiatric training during residency and there is a limited availability of continuing education focusing on the care of patients presenting for behavioral emergencies.[10] Given this, it is not uncommon for emergency physicians to rely heavily on psychiatric consultants, when available, to determine whether patients require psychiatric hospitalization. This form of treatment is the predominant approach for mitigating high, acute suicide risk. Ultimately, the choice whether to discharge a patient from the ED or admit for psychiatric hospitalization is pivotal, because it may impact treatment compliance and prevent suicidal behavior.[11-13] Although research highlights appropriate treatment planning as crucial for ED psychiatric patients, both internal and external factors may impede ED providers' daily care of psychiatric patients. These include delays to psychiatric consultation, barriers to obtaining placement (eg, due to a shortage of inpatient psychiatric beds), and timely transfer.[10,14,15] Not surprisingly, the placement of psychiatric patients typically involves a longer ED length of stay[16-18] and hours of ED boarding[19,20] in an environment often cited as less than ideal for these patients.[21-23]

The deterioration of the infrastructure for treating psychiatric patients across the United States reflects the challenging circumstances in which emergency physicians must practice. Fortunately, ACEP has provided guidance on proper care for these patients.[24] These guidelines emphasize the use of "appropriate psychiatric evaluation and good clinical judgment"[24] as key components in the decision to admit or discharge an ED patient reporting suicidal ideation, while also recommending the discharge of mild suicide risk patients.[24] Furthermore, recent literature has highlighted a pathway for keeping mild or moderate suicide risk patients safe without hospitalization.[25-27] Regardless, emergency physicians may be hesitant to follow available guidelines and evidence-based practices, particularly if they conflict with the clinical judgment of a psychiatric consultant. Current research depicts a conservative approach to the treatment planning of these patients: only ~30% of suicidal patients are discharged from the ED,[28,29] and psychiatric patients are admitted at a rate 2.5 times

> **The Bottom Line**
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> This study identified factors important in treatment planning for suicidal patients in the emergency department. The factors most influential to decisionmaking included current suicide risk, patient age, current depressive disorder diagnosis, and patient history of physical violence.

higher than that of ED patients with a medical complaint.[30] Considering this current climate, the field of emergency medicine would benefit from a deeper understanding of the disposition decisionmaking process undertaken by psychiatric consultants when caring for suicidal patients.

Past research suggests that several factors impact treatment planning for ED patients presenting with elevated suicide risk. Most notable are factors specific to one's suicidal presentation (ie, suicidal planning) and history (ie, prior suicide attempt, family history of suicide, and past psychiatric hospitalization).[28,31-34] There is evidence that ED psychiatric consultants may also weigh specific psychiatric presentations and demographic factors in their decisionmaking. For example, individuals presenting with acute alcohol use disorder and family support are less likely,[31,32,35] whereas those with psychosis are more likely,[32,34] to be admitted for psychiatric hospitalization. Those identifying as male[28,34] and older in age are also more likely to be admitted.[33,34]

Despite evidence that only a handful of variables may drive this decisionmaking, research has not evaluated the process of this decisionmaking when considering the myriad of patient information, often in the form of written text, collected during psychiatric risk assessments. Extant literature has not evaluated which variables are viewed as most important and the manner in which the likelihood of admission or discharge may change as additional variables are considered. Furthermore, because prior studies have not evaluated the decisionmaking process in this way, it is unknown whether the decisionmaking of psychiatric consultants follows a path informed by the extant suicide literature. Notably, a recent meta-analysis of the past 50 years of prospective suicide research identified only a few strong risk factors for suicide attempt or death, including past psychiatric hospitalizations, prior suicide attempt, and suicidal ideation.[36] The presence of suicide plan is also posited as a proximal risk factor, serving as a precursor to suicide attempt.[37] Consistent with this literature, the emergency medicine field identifies suicide plan and prior suicide attempt as important risk factors for consideration during ED suicide risk assessment.[38]

1.3 | Goal

The current study sought to evaluate the influence of several well-documented and readily available risk factors that may influence a psychiatric consultant's decision to admit an ED patient reporting active suicidal ideation for psychiatric hospitalization. Considering past

research identifying the strongest risk factors for suicide in conjunction with ED recommendations for suicide risk assessment,[36-38] it was hypothesized that, when simultaneously considering the factors related to one's current psychiatric presentation, psychiatric history, and socio-demographic characteristics, current suicide plan would be the most important factor in the decision to admit for psychiatric hospitalization. This was anticipated given the proximal, or temporally relevant, nature of this variable, followed by more distal factors of suicide attempt history and number of past psychiatric hospitalizations.

2 | METHODS

2.1 | Study design and setting

A retrospective study was conducted using patient data from 6 hospitals within 1 rural healthcare system (5 community hospitals, 1 academic center) in Pennsylvania. Adult patients presenting to the ED who received a psychiatric consultation during the date range of January 2015 to June 2017 were identified, with inclusion and exclusion criteria subsequently applied to determine the study sample. Within the selected healthcare system, all adult psychiatric consultations are completed on site by either attending staff physicians, resident physicians (supervised by attending staff), advanced practitioners from the Department of Psychiatry, or tele-psychiatrists, with a system-wide standardized psychiatric evaluation used. On conclusion of each assessment, the psychiatric consultant determines whether the patient should be discharged from the ED or admitted for psychiatric hospitalization.

2.2 | Selection of participants and data extraction procedures

Patients were included in the study sample if (1) they presented to the ED during January 2015 to June 2017; (2) they received a complete psychiatric evaluation during consultation; and (3) they reported current active suicidal ideation during the psychiatric evaluation, defined as thoughts to kill oneself or harm oneself with intent to kill oneself. Those who reported a desire to die in the absence of thoughts to enact suicidal self-harm were categorized as experiencing passive suicidal ideation, and, therefore, were excluded from this study. Patients presenting after suicide attempt, regardless of current suicidal ideation, were also excluded from this study. In line with previous ED research investigating suicide risk,[39] we excluded suicide attempters and passive suicidal ideators to support a stringent investigation of decision-making in regards to 1 group, active suicidal ideators. If a patient reported active suicidal ideation during multiple ED presentations within the study period, data from repeated visits were excluded (ie, only the index [first] ED visit data were used). This approach allowed for the investigation of decisionmaking when considering a sample of unique cases, preventing the interference of decisionmaking regarding frequent users of the ED.[40]

Physician notes are a rich source of information and data, therefore, a natural language processing (NLP) pipeline was developed by data engineers to isolate and extract data for variables within the psychiatric assessment note for all patients during the study date range (January 2015 to June 2017). Given that these types of notes are semi-structured and in the form of a questionnaire, the NLP algorithm allowed for an automated extraction approach. Because the standardized order of the psychiatric evaluation questions was known, the algorithm first identified the segment in the note that was a probable candidate for variable location. Then it used regular expression to extract text values for clinical variables used in this study. The use of these methods have been previously used and published by study authors D.M., M.A.D., and B.K.[41] For example, the application of this NLP algorithm allowed for the extraction of text describing sleep difficulties from the electronic psychiatric note into a dataset column created to contain only text describing patient sleep difficulties. Likewise, we were able to extract text recorded in the portion of the psychiatric note evaluating social support into a dataset column created to contain only information describing each patient's current availability of social support, so on and so forth. As the natural language processing algorithm was being developed and tested with the psychiatric assessment notes, multiple iterations were performed on the data to arrive at text results, which were subsequently validated by manual chart review.

This extracted text data was then coded by trained research assistants to identify patients reporting current active suicidal ideation. For this subset of patients reporting current active suicidal ideation, data coding was then conducted for all other variables evaluated during the psychiatric consultation. Aggregate coding by variable was completed via SPSS syntax (Version 20, SPSS Inc. Chicago, IL) to reduce error, with coding conducted using a detailed coding manual. All data coding was checked by the first author; disagreements in coding were discussed until there was a consensus decision. Variables were coded as missing when data were not collected or recorded (eg, a patient refused to answer, the variable was not assessed by the psychiatric consultant during an evaluation) or not enough information was available to make a coding determination (eg, patient was adopted and unsure whether there is a family history of suicide attempt/death). On completion of data coding and review for those reporting current active suicidal ideation, those with missing data for any variable within the psychiatric evaluation were excluded, as these patients did not meet the inclusion criteria of receiving a complete psychiatric assessment. This led to the identification of the study sample. Other data from the electronic health record were also systematically extracted for this study by a data broker. Twenty-nine total variables, outlined below, were extracted for this study. This study was approved by the Institutional Review Board.

2.3 | Measures

Table 1 provides a summary of study variables and coding. A total of 29 variables from the electronic health record were used for this study. This included 28 predictor variables across the following domains:

TABLE 1 Summary of study measures

Variable	Variable coding
Patient demographic and presentation characteristics	
1. Age	Continuous
2. Sex	0 = Male, 1 = female
3. Race	1 = White, 2 = Black, 3 = Other race
4. Presentation day of the week	Weekday = 0, Weekend = 1
Patient psychiatric history	
5. Number of past psychiatric hospitalizations within the current healthcare system	Continuous
6. Lifetime suicide attempt history	No = 0, Yes = 1
7. Family history of suicide attempt or death	No = 0, Yes = 1
8. Self-reported history of physical violence against self or others	No = 0, Yes = 1
Current psychiatric diagnoses	
9. Borderline personality disorder	No = 0, Yes = 1
10. Any depressive disorder	No = 0, Yes = 1
11. Post-traumatic stress disorder	No = 0, Yes = 1
12. Any drug use disorder	No = 0, Yes = 1
13. Alcohol use disorder	No = 0, Yes = 1
14. Bipolar disorder	No = 0, Yes = 1
15. Psychotic symptoms	No = 0, Yes = 1
16. Schizophrenia	No = 0, Yes = 1
Psychiatric evaluation measures	
17. Current living situation	Lives alone = 0, Lives with others = 1
18. Current employment status	Unemployed = 0, Employed = 1
19. Current suicide plan	No = 0, Yes = 1
20. Current access to means for attempting/completing suicide	No = 0, Yes = 1
21. Current availability of social support	No = 0, Yes = 1
22. Current difficulties with concentration	No = 0, Yes = 1
23. Current difficulties with appetite	No = 0, Yes = 1
24. Current decrease in energy	No = 0, Yes = 1
25. Current difficulties with anxiety	No = 0, Yes = 1
26. Current sleep dysfunction	No = 0, Yes = 1
27. Current decrease in interest	No = 0, Yes = 1
28. Current suicide risk	Mild = 1, Moderate = 2, High = 3
Outcome measure	
29. Psychiatric admission	Discharged = 0, Admitted = 1

patient demographic and presentation characteristics, patient psychiatric history, current psychiatric diagnoses (determined using ICD9 and ICD10 codes), and data from the psychiatric evaluation. Of note, patient current suicide risk was evaluated at time of psychiatric assessment and recorded by the psychiatric consultant in accordance with the health system's standardized rating system of mild, moderate, or high risk. Finally, data for patient disposition were used as the primary outcome variable for this study, herein referred to as psychiatric admission, defined as patient psychiatric admission or transfer for psychiatric hospitalization, versus patient discharge.

2.4 | Data analysis

Using SPSS, descriptive statistics were calculated and comparisons between admitted and discharged patients were analyzed using chi-square, Fisher's exact, and the t-test, as appropriate, applying a Bonferroni corrected alpha of $P = 0.01$. To compare the proportion of patients with mild, moderate, and high suicide risk ratings between admitted and discharged categories, post hoc analyses were conducted using z-tests with Bonferroni correction. As the primary goal of this study was to investigate which variables (ie, predictors) most influence a psychiatric consultant's decision to discharge or admit a patient for psychiatric hospitalization (ie, binary outcome) when current active suicidal ideation is reported during a psychiatric evaluation, decision tree analysis was used. Decision tree analysis is a form of supervised learning that is wellaccepted in both medical and psychiatric research, including research on the topic of suicidal thoughts and behaviors.[42] Advantages of this statistical technique include tolerance of outliers and ability to capture nonlinear relationships. In decision tree analysis, the predictor variables are recursively partitioned to identify individuals with similar outcomes. For predictor variables most influencing the outcome, inequalities are created to depict the most meaningful partitioning of data. Each inequality is considered in succession, thus creating a rule set that is interpreted from top to bottom. Therefore, a decision tree provides a visual representation of decisionmaking patterns and depicts how the decisionmaking outcome and corresponding conditional probability may change based on the number of variables considered and the order of consideration. The variable with the greatest impact on decisionmaking will emerge at the top of the decision tree, with additional variables emerging below, in order of importance.

Due to the homogeneity of the study sample, patient race was not included in this model as a predictor. Therefore, 28 of the study variables were used in this model: patient disposition was included as the outcome, whereas the other 27 study variables were entered as predictors. Because we sought to conduct exploratory analyses rather than to create an algorithm for future use, we did not use both a training and test set. Rather, we used the entire sample to create the decision tree using the rpart package[43] in the R statistical environment (R Core Team, 2017). The cost complexity factor was set to the default value of 0.001. Once the model was built, review of the complexity parameter and cross-validated error at each split indicated that post-

pruning was not necessary, suggesting adequate model specification. Post hoc multivariate logistic regression analysis was then conducted to better understand decision tree results using SPSS. This post hoc model included clinician-determined suicide risk level as the outcome, with moderate and high risk collapsed into 1 category and compared to mild risk to mirror the structure of this variable's inequality within the decision tree, with the remaining 26 study variables (ie, disposition decision was not entered, in addition to race as previously indicated) included as predictors. Given that this study aimed to evaluate data that were available to a psychiatric consultant during the decisionmaking process, patients without a complete psychiatric assessment were not included in this study, as previously mentioned. The use of imputation, to address the issue of missing data, would have resulted in the analysis of information not available and not considered by psychiatric consultants during evaluation.

3 | RESULTS

3.1 | Characteristics of study subjects

During the study period there were 533 patients who reported current active suicidal ideation during a psychiatric evaluation for which complete data were recorded. Among these patients, 489 (91.70%) were admitted for psychiatric hospitalization and 44 (8.30%) were discharged from the ED. Table 2 provides overall sample and by group characteristics, in addition to P-value results from statistical comparisons between admitted and discharged patients. Results suggest that discharged patients were significantly older than admitted patients ($t(48) = -3.49$, $d = .54$, 95% confidence interval $= -16.00, -4.31$), with a medium effect observed. There was also a greater proportion of females in the admitted group compared to the discharged group ($\chi^2 (1) = 6.82$, $\Phi = 0.11$), with a small effect observed. In regards to the model comparing the proportion of patients with mild, moderate, and high suicide risk ratings between admitted and discharged categories, a large overall effect was observed ($\chi^2 (2) = 119.67$, $\Phi = 0.47$). Results from post-hoc analyses indicated there was a greater proportion of patients evaluated as mild suicide risk within the discharged group, compared to admitted patients. Additionally, there was a greater proportion of patients evaluated as moderate suicide risk within the admitted group, compared to discharged patients. The proportion of patients evaluated as high suicide risk did not significantly differ between groups.

3.2 | Main results

Figure 1 provides a visual representation of the emerging decision tree. Of the 27 predictors included in the analysis, 4 variables emerged as most influential to clinical decisionmaking, including psychiatric consultant-evaluated suicide risk, patient age, depressive disorder

diagnosis, and history of physical violence. The decision tree displays an inequality for each variable that reflects the most meaningful partitioning (or split) of data, for example, whether the patient was evaluated as mild suicide risk versus moderate or high risk, or whether the patient was $\geq$48 years of age versus <48 years of age. Reviewing the decision tree from top to bottom, inequalities can be combined, in succession, to understand the variety of emerging rule sets. Clinician evaluated suicide risk emerged as the variable most influencing the decision to admit or discharge a patient. Results suggest that when considering this variable independently, those rated as moderate or high suicide risk have a 97% chance of psychiatric admission. Whereas patients rated as mild suicide risk have a 58% chance of admission. However, if a psychiatric consultant were to make a disposition decision for a mild suicide risk patient by considering one other variable, results suggest that age would be the variable most likely considered next, with a new rule set emerging. For example, patients rated as mild suicide risk and $\geq$48 years of age have a 61% chance of discharge. If a psychiatric consultant were to consider a third variable in their decisionmaking, the tree indicates that depressive disorder history is the variable that is most likely to be considered in succession; Mild suicide risk patients, $\leq$48 years of age, with no depressive disorder history are 100% likely to be discharged. Conversely, there was a 71% chance of admission for those rated as mild suicide risk with an age <48 years, with the chance of admission increasing to 79% if the patient also had no history of physical violence. When using post hoc analysis to investigate which study variables were associated with a moderate-to- high suicide risk rating versus mild risk rating by the psychiatric consultant, 4 significant predictors emerged, with small-to-medium effect sizes,[44] as shown in Table 3. Those reporting a current suicide plan, reporting current access to means, or reporting a past suicide attempt during the psychiatric assessment were significantly more likely to be classified as moderate-to-high suicide risk. Those reporting current social support were significantly less likely to be evaluated as moderate-to-high suicide risk.

4 | LIMITATIONS

Limitations of this study should be noted. First, the discharge rate for patients in this sample was lower than that of hospitals cited in published studies (8.30% vs $\sim$30.00%, respectively).[28,29] Therefore, our results may not generalize to other hospitals and healthcare systems with higher discharge rates. Additionally, although race can play a role in suicide risk,[41] we could not investigate the impact of race on treatment planning decisions due to the racial composition of our sample (ie, 95.7% White). Finally, we investigated psychiatric consultant decisionmaking, yet many EDs have limited or no access to psychiatric consultation services. Given that psychiatric assessment and disposition decisionmaking falls solely to the ED provider in these instances, future research should investigate variables that impact the treatment planning decisions independently made by ED providers for suicidal patients.

TABLE 2 Patient characteristics overall and by group

Variables	All patients (n = 533)	Admittedpatients (n = 489)	Discharged patients (n = 44)	Between-groups P- value
Mean age, year (SD)	39 (15.5)	38 (149)	48 (18.8)	0.001
Sex, no. (%) female	282 (52.9)	267 (546)	15 (34.1)	0.009
Race, no. (%)				0.74
White	510 (95.7)	468 (957)	42 (95.5)	
Black	21 (3.9)	19 (39)	2 (4.5)	
Other race	2 (0.4)	2 (04)	0	
Suicide risk, no. (%)				<0.001
Mild	69 (12.9)	40 (82)	29 (65.9)	
Moderate	352 (66.0)	342 (699)	10 (22.7)	
High	112 (21.0)	107 (219)	5 (11.4)	
Time of presentation, no. (%)				0.094
Weekday	427 (80.1)	396 (810)	31 (70.5)	
Weekend	106 (19.9)	93 (190)	13 (29.5)	
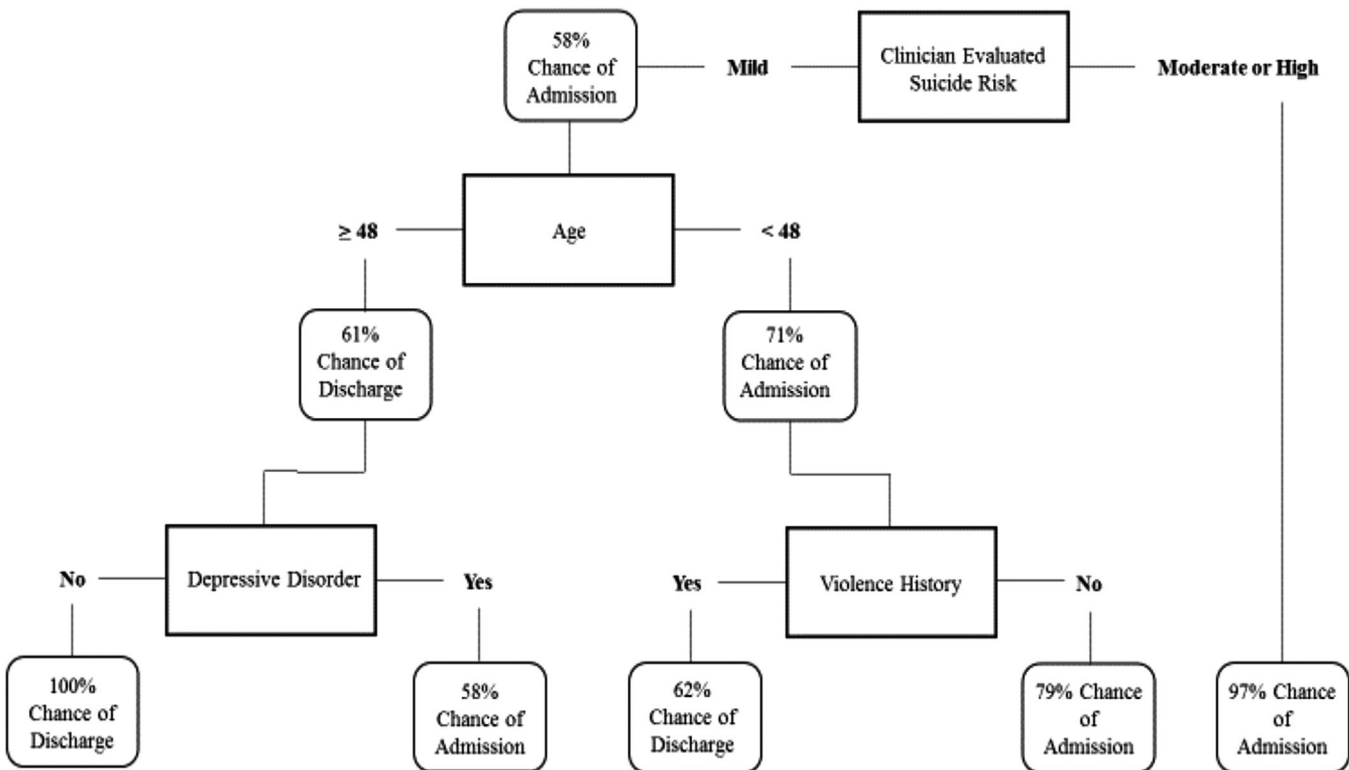
FIGURE 1 Decision tree of variables impacting decision to admit or discharge ED patient reporting active suicidal ideation

5 | DISCUSSION

Results from this study provide an exploratory description of the variables most relevant to disposition decisionmaking for ED patients reporting current active suicidal ideation. Our findings underscore the role of clinical judgment of suicide risk level in the decision to discharge or admit a patient for psychiatric hospitalization. This study suggests that those rated as moderate or high suicide risk have a very high likelihood (ie, 97%) of admission. For patients evaluated as mild suicide risk, the likelihood of admission was only slightly better than chance (ie, ~50%), reflecting the difficulty experienced by psychiatric consultants in this sample to determine which lower risk patients would benefit from immediate psychiatric hospitalization versus which could be safely discharged to outpatient psychiatric aftercare.

TABLE 3 Variables predicting moderate-to-high suicide risk determination by psychiatric consultant

Variables	Low suicide risk (n = 69)	Moderate-to-high suicide risk (n = 464)	
		OR	95% CI
Current suicide plan	1 [Reference]	3.63	1.71–7.71
Current access to means	1 [Reference]	2.74	1.41–5.32
Past suicide attempt	1 [Reference]	2.64	1.28–5.43
Current social support	1 [Reference]	0.39	0.19–0.80

CI, confidence interval; OR, odds ratio.

Among low suicide risk patients, age emerged as the next most highly considered variable when determining disposition. Results suggest that during treatment planning for low suicide risk patients, psychiatric consultants tend to engage in distinct decisionmaking practices for those 18–47 years of age and those 48 years of age and older. Low suicide risk patients in the 18–47 age group were more likely to be admitted, whereas those in the 48 and older age group were more likely to be discharged. Notably, the literature suggests that those 45–54 years of age have a higher suicide risk than those 55 and older, with research identifying suicide as the fourth leading cause of death for the former age group.[45] Therefore, results suggest that those aged 48–54 may be overlooked during ED psychiatric consultations as a group at heightened risk for suicide. Furthermore, among those evaluated as mild suicide risk and younger than 48 years of age, patients with violence history were more likely to be discharged (62% likelihood) than those without a history of violence (21% likelihood). Results suggest a potential bias against admitting patients with a history of physical violence during disposition decisionmaking. Given that staffing level, available rooms types, and patient mix are all considerations to safely placing a violent or potentially violent patient on an inpatient psychiatric unit, our finding may broadly reflect psychiatric consultant understanding of the challenging nature of placing such individuals. This practice, however, is in conflict with empirical and theoretical work supporting the relationship between a history of physical aggression and suicide.[46-48]

Study findings also depict decisionmaking practices with both high and low fidelity. For example, mild suicide risk paired with an age ≥48 years and no current depressive disorder diagnosis resulted in admission 100% of the time. On the other hand, when considering 2 patterns of decisionmaking, each considering 3 variables emerging as important, the probability of selecting a disposition was only slightly better than chance (58% chance of admission if mild suicide risk, ≥48 years of age, and a current depressive disorder diagnosis; 62% chance of admission if mild suicide risk, <48 years of age, with a history of physical violence). These results depict the variable nature of disposition decisionmaking for ED patients when considering practices across a number of psychiatric consultants. Suicidal ideation with certain co-occurring clinical symptoms (ie, depressive disorder, and violence history) may make disposition decisionmaking more difficult for psychiatric consultants. In line with recommendations from ACEP for the care of suicidal patients,[24] this research emphasizes the importance of using objective measures in conjunction with clinical judgment in the ED setting.

Additionally, post hoc results suggest that psychiatric consultants heavily consider empirically supported risk factors for suicide attempt and death by suicide when rating a patient as moderate or high suicide risk. These include history of suicide attempt, current suicide plan, and social support, with current suicide plan emerging as the strongest predictor with a moderate effect size.[36,37] These findings are also consistent with research investigating determinants of disposition decisionmaking.[29,31,32] Additionally, access to means for attempting and/or completing suicide also emerged as a predictor of consultant determined suicide risk, highlighting the widespread consideration of this variable during suicide risk assessment among the psychiatric consultants in this sample. Notably, given prior research documenting psychiatric hospitalization history as a variable impacting disposition decisionmaking[31-34] and as a major risk factor for both suicide attempt and death by suicide,[36] it was surprising that this variable did not emerge within the decision tree.

Furthermore, this study also found that 58% of mild suicide risk patients were admitted. Given that ACEP recommends the discharge of mild suicide risk patients,[24] this result highlights the challenge emergency physicians may face in following specialty guidelines when a psychiatric consultant recommends admission for these patients. Results from this study underscore the importance of an emergency physician's ability to balance the application of clinical guidelines with consideration of the clinical judgment offered by a psychiatric consultant. Greater psychiatric training opportunities for emergency physicians would likely enhance confidence and competency during the evaluation of suicide risk and treatment planning for suicidal individuals, especially in instances when psychiatric consultants are unavailable.

The use of adjunct measures of suicide risk may also increase confidence and competency in these areas. However, given the number of available adjunct measures of suicide risk with low predictive validity and a limited number of measures suitable for use in the fast-paced ED setting,[24,49-52] further research is needed, particularly in the use of machine learning to improve suicide risk prediction.[42,53] Future work in the ED setting should focus on incorporating valid and reliable predictive algorithms as an aid to existing clinical decisionmaking practices, while also aligning suicide risk decisions with appropriate and evidence-based clinical interventions to reduce patient suicide risk.[25-27,52,54] Overall, results from this study provide important implications for improving ED care and treatment planning for patients reporting active suicidal ideation.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

ACK, BAA, and RJS conceived and designed the study and supervised study conduction. MAD, DM, and BK created the natural language processing algorithm and extracted data. SALF performed data collection and coding. ACK reviewed all data coding and performed statistical analysis. ACK and BAA drafted the manuscript. All authors contributed

substantially to its revisions. RJS takes responsibility for the paper as a whole.

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