

Suicide Attempts After Emergency Room Visits: The Effect of Patient Safety Goals

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Abstract In 2007 the Joint Commission National Patient Safety Goals included a requirement addressing risks associated with patient suicidality. The rationale for this requirement was that suicide has been the most frequently reported sentinel event since the inception of the Sentinel Event Policy in 1996. The Patient Safety Goals on suicide required hospitals implement actions to assess suicide risk, meet client's immediate safety needs and provide information such as a crisis hotline to individuals and family members for crisis situations. This study performed a secondary data analysis to assess the effect of the 2007 Joint Commission Patient Safety Goals on suicide attempts among patients following treatment at hospital emergency rooms among individuals enrolled in the Florida Medicaid program. A difference-in-difference approach compared changes in rates of suicide attempts for individuals with a primary mental health diagnosis and individuals with a physical health diagnosis after emergency room treatment. In the 6 months following treatment, suicide rates declined after implementation of the goals among patients treated for a primary mental health diagnosis, and increased among patients with a poisoning diagnosis, compared to individuals with a physical health diagnosis. The goals were associated with a reduction in suicide attempts after emergency room treatment.

Keywords Suicide risk · Patient safety · Suicide assessment

Introduction

In 1999, the Institute of Medicine (IOM) issued a recommendation that health care organizations should establish patient safety programs based upon well-understood safety principles that focus on increasing the safety of patients and reporting and analyzing

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medical errors [1, 2]. These recommendations from the IOM and the directives from the federal government resulted in revisions to Joint Commission (JC, formerly called the Joint Commission for Accreditation of Hospital Organizations or JCAHO) standards of accreditation so that programs for the reduction of medical error and the enhancement of patient safety were emphasized [1]. In 2002, the JC began issuing National Patient Safety Goals, and the 2007 National Patient Safety Goals included a new requirement addressing risks inherent in the patient population, especially risks associated with patient suicidality [3]. The rationale for this requirement (requirement 15A) was that suicide has been the most frequently reported sentinel event since the inception of the Sentinel Event Policy in 1996. The JC defines “sentinel events” as an event that “is an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof” [4]. Nearly 20 % of the deaths reviewed by the accreditation committee [1] and 16.3 % of all sentinel events since 1995 were due to suicides, the leading cause of accidental death in hospitals [3].

The Patient Safety Goals on Suicide required hospitals implement actions to accomplish three goals: (1) a risk assessment that includes identification of specific factors and features that may increase or decrease risk for suicide; (2) the client’s immediate safety needs and most appropriate setting for treatment are addressed; and (3) the organization provides information such as a crisis hotline to individuals and family members for crisis situations. The requirements apply only to patients with a primary mental health diagnosis in hospitals including emergency rooms. A risk assessment could include patient characteristics associated with higher risk [e.g., 5] or a validated assessment scale such as the Revised Suicide Trigger Scale [6]. Surveys by the Joint Commission found that 98 % of hospitals were compliant with the requirements.

The limitation to individuals with a primary mental health diagnosis is noteworthy given that research has shown suicide risk is high among people who come to the emergency room (ER) with no known suicidality or mental health issue [7]. As many as 25–70 % of people who died by suicide visited emergency departments for non-suicide-related reasons shortly before their death [8–10]. Discharge from emergency departments with a non-causative diagnosis is associated with higher subsequent suicide risk [11–13]. In other words, the ER represents an important setting that can make a tremendous impact upon patient safety and well being. Unfortunately, 81 % of the most at risk patients are not identified in the ER [7].

This study examined whether the JC goals were associated with a reduction in suicide attempts following ER visits. Changes in rates of suicide attempts following implementation of the JC Patient Safety Goals were examined for Florida Medicaid recipients in the 6 months after ER visits. Changes were compared for individuals with primary mental health diagnoses, the primary target of the safety goals, and individuals with secondary mental health diagnoses and/or physical health diagnoses.

Materials and Methods

Data

The project examined Florida Medicaid, Florida Department of Health Vital Statistics, and involuntary examination data for individuals with ER visits. The sample included individuals with ER visits during between 4/1/2005 and 9/30/2005 or 4/1/2007 and 9/30/2007. The time periods were chosen to allow for a pre-post comparison that did not overlap the implementation date of 1/1/2007. The same months in the years were used to account for

seasonal variation in suicide attempts. In order to provide a 6 month follow-up period, the time frame ended at 9/30/2007 because available data ended on 3/31/2008.

Emergency room visits were placed into four categories based on diagnosis. The categories were expected to represent a declining suicide risk. ER visits with a primary mental health diagnosis ER comprised the first group [International Classification of Diseases, Ninth Revision (ICD-9) 290-319]. This group was the primary focus of the JC mandate, and the implementation of the patient safety goals was expected to be associated with a reduction in the number of suicide attempts. ER visits with a secondary mental health diagnosis were placed in the second group. It was difficult to predict whether the JC mandate would have an impact on this group. While not directly affected by the mandate, a greater awareness of suicide risk by physicians may spillover to individuals with secondary mental health disorders. Third, a number of ER visits were identified with a poisoning diagnosis but no mental health diagnosis or suicide code. While many ER visits with a poisoning diagnosis may represent accidental poisonings, some were expected to be unidentified suicide attempts and would put individuals at greater risk for future attempts. Finally, the fourth group contained ER visits due to a physical health diagnosis, and was the primary control group. The JC mandate was expected to have the least impact for such ER visits because the visit did not entail a mental health diagnosis.¹

The sample was limited to one ER visit per person in each time period due to the complexity of including multiple ER visits, particularly when one or more had a mental health diagnosis and others do not, and the time between ER visits was for some individuals only one or a few days. Two steps were used to select the ER visit for each person. First, the ER visits for each person in each time period with the highest expected suicide risk were selected. Second, the first visit within that category was included as the sample ER visit. Thus, a person with an ER visit involving a primary mental health diagnosis had that visit counted as the sample ER visit regardless of whether there were prior or subsequent visits for physical health reasons. A person that did not have an ER visit involving a primary mental health diagnosis, but had one or more ER visits with a secondary mental health diagnosis had the first ER visit with a secondary mental health diagnosis included in the sample. An individual with an ER visit for a poisoning diagnosis but no mental health diagnoses would have that ER visit counted. If the person had no ER visits with a primary mental health diagnosis, secondary mental health diagnosis, or a poisoning diagnosis, their first ER visit with a physical health diagnosis was included in the sample.

Suicide attempts within 6 months of the ER visit were identified from Medicaid claims data through the ICD-9 E codes (E959-E959.9). Completed suicides may not be observed in Medicaid data. Consequently, Vital Statistics data listing cause of death were used to identify deaths due to suicide (ICD-10 codes of X60-X84). Six months is a common follow-up period to assess suicide risk.

Analysis

Variable means were assessed to determine the characteristics of emergency room patients that have greater risk for a suicide attempt. Such factors included demographics (age, race, and gender), history of involuntary examinations or psychiatric hospitalizations, and physical or mental health diagnoses.

¹ An ER visit due to a suicide attempt was not included as a distinct observation for this analysis because it is well known that a suicide attempt is a clear risk factor for future suicide risk and merits psychiatric intervention.

Logistic regression models were estimated to examine factors related to suicide attempts. The regression specification was based on The Behavioral Model of Health Services [14, 15] and examined the relationship between health outcomes (a suicide attempt), and population/individual characteristics and health behaviors. In order to determine whether the outcomes changed after the implementation of the requirement, a difference-in-difference model was estimated:

$$\text{Hlth outcome}_{ih} = \text{Pop_chars}_{ih} \cdot \alpha + \text{Health_services}_{ih} \cdot \beta + \text{Post}_{ih} \cdot \mu + \text{Group}_{ih} \cdot \pi \\ + \text{Post}_{ih} \cdot \text{Group}_{ih} \cdot \chi + \text{Hospital}_h \cdot \delta + \varepsilon$$

where i denoted patients and h hospitals; Hlth outcome denoted a suicide attempt; Post denoted ER visits occurring between 4/1/2007 and 9/30/2007; Group denoted the four groups discussed above (primary MH, secondary MH, poisoning; physical health only was the reference group); Post group determined whether changes in suicide rates differed across the four groups of individuals.

Control variables included individual characteristics of the patients including race (white, black, Hispanic, other), gender, and age. Younger individuals typically have higher rates of suicidal behavior while blacks have lower rates of suicidal behavior. The use of health services included the receipt of an involuntary examination or having a psychiatric hospital stay within 6 months prior to the emergency room visit. An involuntary examination occurs when individuals are not competent to or not willing to consent to voluntary treatment, and appear without treatment either to be unable to care for self or present a substantial likelihood of bodily harm to self or others (Ch 394 FS) [16]. The examinations can be initiated by selected mental health professionals, law enforcement officials, or judges and authorize receiving facilities to hold individuals involuntarily for up to 72 h for examination and treatment. High rates of prior involuntary examinations have been found among individuals who complete suicide [17]. Similarly, a psychiatric hospital stay within the 6 months prior to the ER visit was expected to signal an increased suicide risk. Among individuals with mental illness, we explored differences between mental health diagnoses. However, because of the small number of people that attempt suicide with a specific diagnosis, such an analysis would lack sufficient power. Prior suicide attempts are also an important predictor of future attempts. However, by selecting the first ER visit in the data, no individual had a prior suicide attempt in the available data.

Hospital fixed effects (hospital) were also included in the specification by adding 131 categorical variables denoting each hospital with at least 150 ER visits in the sample. ER visits that occurred in smaller facilities were excluded from the regression analysis. The cut-off of 150 was somewhat arbitrary, but the results were similar when selecting different cut-offs. Suicide rates were expected to vary across hospitals based on location and patients typically served. While most research on suicide focuses on patient characteristics, provider characteristics are also associated with patient health outcomes [18]. For example, completed suicides were more likely after hospitalizations at medical centers relative to regional hospitals [19]. Hospital identifiers accounted for unobserved time invariant hospital characteristics, and thus enabled changes in suicide rates within hospitals to be examined.

Results

Table 1 provides descriptive statistics for individuals with ER visits. The period prior to the implementation of the JC mandate had 215,216 ER visits in the sample and the post period had

Table 1 Demographic and diagnostic characteristics before and after the Joint Commission mandate

Sample characteristics	Pre-period		Post-period	
	N	%	N	%
Suicide attempts	229	0.11	141	0.07
Age				
≤40	138,304	64.26	120,463	61.59
>40	76,912	35.74	75,131	38.41
Race				
Black	57,043	26.50	52,379	26.78
Hispanic	51,089	23.74	46,513	23.78
Other	23,945	11.13	21,735	11.11
White	83,139	38.63	74,967	38.33
Gender				
Female	127,894	59.43	117,232	59.94
Male	87,322	40.57	78,362	40.06
Group				
Primary MH diagnosis	11,295	5.25	8,165	4.17
Secondary MH diagnosis	26,593	12.36	27,105	13.86
Poisoning diagnosis	687	0.32	670	0.34
Physical health diagnosis	176,641	82.08	159,654	81.63
Prior involuntary exam	3,899	1.81	3,368	1.72
Prior psychiatric hospitalization	2,522	1.17	1,256	0.64
ER visits	215,216		195,594	

195,594 ER visits. There were 229 suicide attempts or completed suicides (or .11 %) within 6 months of an ER visit in the pre period and 141 (.07 %) in the post period. In the pre period, the racial distribution was 39 % white, 27 % black, 24 % Hispanic, and 11 % were listed as other races. A majority of the sample (59 %) is female. The racial and gender breakdowns were similar in the post period. A small percentage of individuals had involuntary exams or psychiatric hospitalizations in the 6 months prior to the ER visit in both periods.

In the pre period, a large majority of ER visits (82 %) were for physical health reasons, while 5 % had a primary mental health diagnosis, 12 % a secondary mental health diagnosis, and .3 % a poisoning diagnosis. A large majority of ER visits remained for physical health reasons in the post period. However, the proportion of ER visits that had primary mental health diagnoses declined from 5.3 to 4.2 % ($\chi^2 = 223.8, p < .001$) while the proportion with secondary mental health diagnoses increased from 12.4 to 13.9 % ($\chi^2 = 167.1, p < .001$).

The rate of suicide attempts differed significantly ($\chi^2 = 511.5, p < .001$) across the four diagnostic groups ranging from .6 % of ER visits with a primary mental health condition to .04 % of ER visits due solely to a physical health condition. Interestingly, ER visits with a poisoning diagnosis but no code for a suicide attempt had a higher subsequent rate of suicide attempts (.5 %) than ER visits with a secondary mental health condition (.2 %).

Table 2 presents logistic regression results that examined changes in suicide attempts after the implementation of the JC mandate. Only variables with statistically significant coefficients were retained in the final specification. Suicide rates declined among individuals with a primary mental health diagnosis (OR .65, CI .45–.94). No clear conclusion

Table 2 Logistic regression results comparing suicide attempts/completed suicides before and after the Joint Commission mandate

Logistic regression results			
Dependent variable: suicide attempt/completed suicide			
	Odds ratio	95 % CI	
Intercept	–		
Age	0.99	0.98	0.99
Race			
Black	0.46	0.33	0.67
Hispanic	0.47	0.32	0.68
Other	0.81	0.58	1.13
Prior involuntary exam	5.23	3.93	6.97
Group			
Primary MH diagnosis	11.17	8.16	15.29
Secondary MH diagnosis	5.18	3.90	6.87
Poisoning diagnosis	9.84	4.47	21.63
Post-Primary MH diagnosis	0.65	0.45	0.94
Post-Secondary MH diagnosis	0.76	0.52	1.10
Post-Poisoning diagnosis	3.60	1.95	6.66
Provider ^a	–		
<i>N</i>	410,810		
Likelihood ratio	856.1		

^a The specification also included 131 categorical variables denoting hospitals

could be drawn for individuals with a secondary mental health diagnosis. The coefficient was not significantly different from zero suggesting individuals with a secondary mental health diagnosis were similar to those with a physical health diagnosis. At the same time, the coefficient did not differ significantly from the coefficient for a primary mental health diagnosis. Individuals with an ER visit for a poisoning without an associated suicide code had a higher risk of future suicide attempt in the post period (OR 3.60, CI 1.95–6.66).

Among the other results, suicide attempts declined with age, and were lower for blacks and Hispanics than whites. Suicide rates were higher for individuals with prior involuntary examinations. Suicide rates were also higher for individuals with a primary or secondary mental health condition, or as poisoning than for individuals with a physical health diagnosis. The odds ratios for each provider were not reported to conserve space. The Wald χ^2 (183.6, $p < .001$) indicates significant variation in suicide rates across providers.

Discussion

This study examined changes in rates of suicide attempts after the implementation of a Joint Commission mandate that required hospitals to assess individuals with a primary mental health diagnosis for suicide risk. Among the important findings, suicide rates declined for individuals with a primary mental health diagnosis relative to individuals with a physical health diagnosis. The results for individuals with a secondary mental health diagnosis were similar in magnitude, although lacked sufficient precision to be considered statistically significant. There was a significant increase in suicide attempts among patients with a poisoning diagnosis but no mental health diagnosis.

The JC Safety Goals were meant to increase attention to suicide risk among patients with primary mental health conditions. This goal appears to have been accomplished. The obvious question would be whether the JC Safety Goals should be expanded to include individuals with ER visits that are not primarily due to a mental health condition. The results do not provide a clear answer for individuals with a secondary mental health diagnosis. Conceivably the JC Safety Goals made ER personnel more aware of patient suicide risk and there were spillover effects that benefitted individuals with secondary mental health conditions.

The finding that the proportion of ER visits that had a primary mental health diagnosis declined, while the proportion of ER visits that had a secondary mental health or a poisoning diagnosis increased is cause for concern. Such results may be problematic if physicians altered diagnosing patterns based on the need to assess individuals if they list a primary mental health diagnosis. Similarly, given the focus on reducing suicides, one possibility is that some physicians or hospitals avoided listing the E code for a suicide attempt, and instead used the poisoning diagnosis and required an involuntary examination. This concern is heightened by the finding that suicide rates increased among individuals with a poisoning diagnosis in the post period.

Limitations

Administrative data provide an opportunity to study many important public policy questions. However, there are important shortcomings with administrative data. One shortcoming to this analysis may be the identification of suicide attempts in the ER. Inaccurate coding or lack of complete coding is problematic with claims data. Second, all hospitals were included in the JC directive. While JC surveys indicate that almost all hospitals were in compliance with the requirement in 2007, the degree of implementation is likely to vary between and within hospitals (e.g., across physicians). Such effects can only be observed by being in the ER and observing physicians and staff as they interact with patients. Administrative data lack important characteristics that might be associated with future suicide attempts. The focus on one state (Florida) and individuals with a specific insurance coverage (Medicaid) also limits the generalizability of the results.

Conclusions

This study examined changes in suicide attempts after the implementation of a Joint Commission mandate that hospitals assess individuals by treated for emotional and behavioral problems for suicide risk. Florida Medicaid recipients with ER visits were examined, and a small decline in suicide rates was found for individuals with a primary mental health diagnosis compared to individuals with a physical health diagnosis. Future research should examine changes in diagnostic coding away from primary mental health diagnoses and towards secondary mental health and poisoning diagnoses.

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