

Review of Predictors of Suicide Within 1 Year of Discharge from a Psychiatric Hospital

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Current Psychiatry Reports 2008, 10:60–65
Current Medicine Group LLC ISSN 1523-3812
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Previous research has shown that suicide risk is highest in the year after people have been discharged from a psychiatric hospital. As such, identifying predictors of suicide within this time frame is important. Results from a systematic database search showed that all significant suicide predictors—those found in more than one study—could be grouped into factors related to suicidality, patient care factors, and demographic and psychopathological factors. Increased knowledge of suicide predictors for this particularly high-risk time, identified in this review, can help inform prevention and intervention efforts that may significantly reduce suicide rates.

Introduction

Suicide is a prevalent cause of death in adolescents and adults [1]. Patients with psychiatric illness have a much higher suicide rate than the general population. Those whose illnesses necessitate psychiatric hospitalization are at an increased risk of suicide [2]. Previous studies have estimated that 57% to 100% of psychiatric patients who die by suicide have been in contact with inpatient psychiatric services within 1 year of their death [3]. It is clear that suicides cluster in the immediate postdischarge period, although the duration of this study period has differed greatly across studies.

Although it is clear that the suicide rate is higher within 1 year of discharge from a psychiatric hospital, predicting who is at highest risk during this time is more difficult. It has been estimated that 6% of all suicides occur in the immediate postdischarge period. Therefore, a more thorough knowledge of risk factors for suicide could

help to lead prevention and intervention efforts that may significantly reduce suicide rates.

Numerous studies have been conducted examining possible variables associated with suicide in this period. However, to date, there has been no comprehensive review of these factors. Therefore, the purpose of this review is to draw together findings from various studies and identify variables that can be used to better predict who is at highest risk of suicide within 1 year after discharge.

Methods

The review began with a comprehensive examination of publications concerning the rate and predictors of suicide after discharge from psychiatric hospital. The databases MEDLINE, PubMed, and PsycInfo were systematically searched from any past year through December 2006; only English language articles were used. The literature search used the following keywords: “suicide,” “risk/risk factors,” “discharge/patient discharge/hospital discharge,” “mental disorders,” “hospitalization,” and “psychiatric hospitalization.” These criteria were also applied to titles and abstracts. The results were reviewed, and studies that included an examination of possible suicide predictors within 1 year of hospital discharge were retrieved. Studies were excluded if the following applied: 1) they only studied a postdischarge period of more than 1 year, 2) they discussed suicide rates but did not research any possible predictor variables, and 3) they focused only on children or adolescents aged less than 15 years. Studies discussing inpatient suicide were included provided they also discussed postdischarge suicide. The reference lists of all included studies were examined for additional relevant articles that were then reviewed for eligibility. A master's-level library specialist reviewed the search strategy and deemed it comprehensive. No attempt was made to identify unpublished studies.

Results

The initial search revealed 45 articles relevant to suicide after discharge. After we reviewed the articles in detail

and applied the exclusion criteria, we used 28 articles that examined predictors of suicide within 1 year of discharge and that looked at specific risk factors.

Literature search results revealed that an increased risk of suicide in the postdischarge period has been repeatedly observed in different countries, populations, and time periods [4–7]. Ho [4] examined the rates of suicide after hospitalization in Hong Kong within 28 days of discharge and also from 29 to 365 days postdischarge. The standardized mortality ratios (SMRs) in the 28-day period were 113 (95% CI, 86–147) and 178 (95% CI, 132–235) for males and females, respectively. In the 29- to 365-day period, the SMRs were 24 (95% CI, 19–30) and 44 (95% CI, 35–55) for men and women, respectively. Therefore, rates in the first month after discharge were 4.6 times higher in men and four times higher in women in comparison to the 29- to 365-day period. Goldacre et al. [5] calculated SMRs for the same postdischarge periods using a population-based study of the Oxford health region in the United Kingdom. In the first 28 days after discharge, SMRs were 213 (95% CI, 137–317) and 134 (95% CI, 67–240) for men and women, respectively. In comparison to the 29- to 365-day postdischarge period, suicide rates within 28 days were 7.1 times higher for men and 3.0 times higher for women [5]. Therefore, the significantly increased suicide risk during the immediate postdischarge period was of a similar magnitude in both studies.

Lawrence et al. [6] examined suicide rates in western Australia but reduced the postdischarge period into smaller sections. This study showed that suicide rates change over time in the discharge period. Researchers found that suicide rates were highest in the first week postdischarge, with rate ratios of 253.86 (95% CI, 204–316) and 350.34 (95% CI, 244–503) for men and women, respectively. Rates in the first 28 days of the postdischarge period were similar to the previously described studies, with rate ratios of 126.48 for men and 116.81 for women, but they were significantly lower than the first week's rates. Rate ratios were even lower when averaged over 6 months postdischarge: 45.12 for males and 56.67 for females [6]. King et al. [7] found that 34% of patients had died by suicide within 28 days of discharge. Proportions of suicides decreased throughout the discharge period, with 27% dying by suicide between months 1 and 3, and 22% between months 4 and 6 [7]. In summary, our review confirms that recently discharged patients may be at 100-fold greater risk of suicide compared with the general population, and this risk peaks in the weeks immediately after discharge.

Although 28 studies were identified in the literature search, only 11 compared patients who died by suicide after discharge with discharged patients who did not die by suicide. Other studies used a variety of comparisons, such as matched participants from the general population or suicides within 1 week or within 3 months compared

with later suicides, and some used no control group. When a patient is discharged, the clinician must allocate services based on each individual patient's risk compared with other patients on the ward. Discharged patients who did not take their own lives were considered the most meaningful comparison group and were used when discussing predictor variables.

Due to the methodological variability of the included studies, a meta-analysis could not be performed across all the findings. The first problem was the previously mentioned variability in comparison groups used across studies. Another problem was the measurement of predictors. Due to the studies' retrospective nature, the reliability of measures used was unclear, and the predictors that were studied varied greatly. For example, medical charts, which can be unreliable, often were used. The chart record may not involve a uniform assessment and may not be filled out in a consistent way across studies. Other studies used interviews with psychiatrists or family members, and one study simply recorded the length of medical entries as a variable [8]. After reviewing all variables found to be significant in more than one study, three main categories of predictors revealed themselves as possible risk factors: factors related to suicidality, patient care factors, and demographic and psychopathological factors.

Suicidal history

Several articles that compared suicides with nonsuicides in discharged patients revealed that inpatients admitted with a lifetime history of suicide attempts are at a significantly increased risk of suicide postdischarge. Yim et al. [3] conducted a study in which each patient discharged from a general hospital in Hong Kong who died by suicide within 1 year was matched for sex, age (within 5 years), diagnosis, and time of discharge (within 6 months) with a discharged patient still alive after 1 year. Patients who died by suicide were more likely to have attempted suicide in the past and also had a higher mean number of suicide attempts [3]. Steblaj et al. [9] looked at patients with schizophrenia and affective disorders who died by suicide while they were inpatients or on trial discharge. Both groups were shown to be more likely to have displayed suicidal behavior in the past than patients who did not die by suicide. Kullgren [10] looked only at patients with borderline personality disorder who did and did not die by suicide postdischarge. In accordance with other research findings, results showed that completed suicide was more likely in patients who had attempted suicide more than once previously [10].

Several other studies examined deliberate self-harm (DSH) as a predictor in relation to suicidal history. King et al. [1] matched participants with a similar method to that of Yim et al. [3]. After reviewing the psychiatrists' case notes, researchers found a DSH history to be significantly more common in patients who died by suicide while in the hospital or within 1 year

Table 1. Variables significantly related to suicide after recent discharge: measures of suicidality

Suicidality	Studies (suicide vs controls)	Odds ratios	Significance
Past suicide attempts	Yim et al. [3]	3.1 (1.5–6.6)	
	King et al. [1]	4.09 (2.58–6.48)	
	McKenzie and Wurr [8]	13.8 (3.6–52.6)	
	Fernando and Storm [11]		$P < 0.05$
	Stebalaj et al. [9]		$P < 0.001$ for schizophrenia vs controls; $P = 0.004$ for affective disorder vs controls
	Kullgren [10]		$P < 0.05$
Suicide ideation/attempt before admission	Yim et al. [3]	3.4 (1.5–8.0)	
	King et al. [1]	1.93 (1.22–3.06)	
	Fernando and Storm [11]		$P < 0.02$ and $P < 0.05$
	Kullgren [10]		$P < 0.05$
Self-harm/suicide attempt during admission	King et al. [1]	2.57 (1.00–6.62)	
	McKenzie and Wurr [8]	10.5 (1.7–63.2)	
	Fernando and Storm [11]		$P < 0.02$ and $P < 0.05$

of discharge than in the matched comparison group. McKenzie and Wurr [8] broke their sample into early suicides (within 3 months of discharge), late suicides (after 3 months), and controls (those discharged who did not die by suicide). Results showed that patients in the early suicide group had more previous DSH incidents than the late and control groups. Fernando and Storm [11] also examined patients who died by suicide within 3 months of discharge. Their results matched those of McKenzie and Wurr [8], with more DSH histories found in individuals who died by suicide [11].

Several other predictive factors fell into this category. Several studies comparing suicides within 1 year of discharge with those who did not die by suicide postdischarge found suicide ideation/attempt before admission to be a predictor of completed suicide [1,3,10,11]. Results also revealed that a self-harm/suicide attempt during admission was a significant predictor of suicide [1,8,11]. Results for these variables are summarized in Table 1.

Demographics and psychopathologic factors

Finding significant suicide predictors in regard to sociodemographic variables was more difficult. A very broad range of factors has been assessed previously, and significance levels varied greatly. Unemployment stood out as one variable associated with suicide in the postdischarge period [1,3]. Another variable that was examined was having a lower level of social support. It was shown that discharged patients who died by suicide were more likely to live alone or not with either parent or to have an unsatisfactory relationship with their parents [1,8,12]. Other studies grouped certain demographic variables into

one larger variable. Fernando and Storm [11] took this approach to studying these variables by grouping them into one category called “losses.” Losses included divorce or separation; illness or death of a first-degree relative or close friend; or job loss through redundancy, retirement, or dismissal within the previous year. Results showed that patients who died by suicide after discharge had experienced significantly more losses in the previous year than controls [11]. Pokorny and Kaplan [13] took a similar approach by looking at negative life events such as death of a spouse, detention in jail or other institution, death of a close family member, major personal injury or illness, being fired from work, sexual difficulties, death of a close friend, and foreclosure on a mortgage or loan. These events were predictors of suicide postdischarge only when the person also could be characterized by high defenselessness. Therefore, only an interaction of the two could help to predict who was at greater risk of suicide [13].

Psychopathologic factors also were examined extensively throughout the literature, and two major mental illnesses were revealed as potential risk factors for completed suicide. Results showed that discharged patients with schizophrenia were at an increased risk of death by suicide [11,14••]. Another illness that stood out as a possible suicide predictor in the postdischarge period was an affective disorder or depressive symptoms [3,8,9,12,14••].

Care variables

Another category of suicide predictors that became apparent during this review was that of variables associated with quality and length of care. In regard to length, shorter hospital admissions were associated with suicide

Table 2. Variables significantly related to suicide after recent discharge: care factors

Care factor	Studies	Odds ratios	Significance
Compliance with treatment	Yim et al. [3]	8.0 (1.8–34.8)	Fewer follow-up appointments
	Desai et al. [14••]		
Unplanned discharge	Yim et al. [3]	4.0 (0.8–18.8) trend level	
	King et al. [1]	2.73 (1.77–4.22)	
Continuity of care	King et al. [1]	16.82 (3.54–79.8)	Fewer follow-up appointments
	Desai et al. [14••]		
Shorter admissions	Modestin et al. [15]		Trend level
	Desai et al. [14••]		Length < 14 days
	Schwarzenbach [16]		$P < 0.01$

after discharge from hospital [15–17]. Desai et al. [14••] found that a length of inpatient stay of 1 to 7 days, or 7 to 14 days versus longer stays was predictive of subsequent suicide. Although most studies have found short hospital stays to be predictive of suicide [14••,18••], a more recent study by Ho [19•] found contrary results. In this study, patients whose hospital stays were shorter than 15 days had the lowest suicide rates in the first year after discharge. A short hospital stay in Hong Kong, where the study took place, may have reflected simple psychopathology, quick recovery, and adequate psychosocial support. As a risk factor, length of hospital stay may have a different meaning in different contexts.

Results showed that poorer compliance with treatment was found in the suicide group. Yim et al. [3] found that patients who died by suicide were more likely to have had poor medication compliance after hospitalization. Qurashi et al. [20••] completed a prospective study in which they compared the amount of suicidal ideation and behavior in compliant and noncompliant discharged psychiatric patients. Results showed that noncompliant patients had higher levels of suicide ideation postdischarge [20••]. This supports the results from the Yim et al. [3] study of noncompliance with medication as a risk factor for suicide.

Another care variable reviewed was whether the patient's discharge had been planned. It was found that patients with an unplanned discharge or who were discharged against medical advice were more likely to die by suicide postdischarge [1,3,17]. Meehan et al. [21•] studied this further by comparing care variables in those with a planned versus an unplanned discharge. They found that patients who had discharged themselves without a plan had significantly less continuing community care, more often had missed their last appointment, and were more out of contact with services at time of suicide. All these factors put people at risk for suicide, suggesting that unplanned discharges are a significant suicide predictor in the postdischarge period [21•].

The other predictor in this category was continuity of care. King et al. [1] examined several aspects of care in the postdischarge period. Researchers found that patients admitted under a new consultant or whose key personnel were on leave or leaving were more likely to die by suicide. However, having continuous care in the postdischarge period was a protective factor [1]. Desai et al. [14••] also looked at continuity of care and found that having fewer follow-up appointments in the postdischarge period was associated with an increased suicide risk. Results for these variables are summarized in Table 2.

Discussion

Although great variability is evident in the findings in the current literature on postdischarge suicide, this review has revealed three categories of predictors and emphasized the high suicide risk for discharged patients during this period. This overview has made clear the importance of studying suicide in the immediate postdischarge period, as suicide rates are much higher in this time period [1,4–6]. An awareness of these findings can help clinicians to be more careful when planning discharge and to be more cautious when deeming an inpatient ready for discharge. The history of previous suicidal behavior, the presence of suicidal ideation or behavior on or during admission, the diagnosis of depression or schizophrenia, unemployment, and low social support all have been considered as significant risk factors for suicide and appear to contribute to the risk immediately after discharge. Our review found the lack of continuity of care or noncompliance with treatment to be strongly associated with suicide following discharge from the hospital. The unique importance of these care variables demands more attention, particularly because these variables are potentially modifiable.

One limitation that was often raised was the retrospective design of most recovered studies. Researchers were not blind to participant outcomes; therefore, results may have been biased. Also, medical notes were

not always comprehensive. Any prospective studies that were conducted used suicidal behavior or ideation as outcomes, as completed suicide is too rare an event to study in the available samples. Although this is a significant limitation of current research, the few prospective studies have found results comparable to those of retrospective studies. King et al. [12] conducted a prospective study of adolescents discharged from a psychiatric hospital. A history of suicidality was a predictor, with results showing that suicidal behavior in the 6-month period after discharge could be predicted by hospitalization for an active and serious suicidal intent before admission and suicidal ideation during hospitalization. Similar to retrospective studies, patients with suicidal behavior were more likely to have been diagnosed with depression, specifically dysthymia, and were not living at home with one or two parents. These patients also had low social support as measured by negative perceptions of family functioning [12]. More prospective studies need to be conducted to establish further support for this review's findings.

Another possible limitation was how studies were reviewed for eligibility. No independent reliability check was done to ensure that inclusion and exclusion criteria were being applied reliably. However, researchers did develop a consensus on the criteria and discussed any article whose eligibility was not clear. Therefore, it is thought that this limitation did not affect results.

Conclusions

A history of suicidality was a variable that could be expected to predict later suicide, and findings supporting this were anticipated. What are more notable are the care variables that were revealed as risk factors throughout this review. Even more encouraging is that these risk factors can be changed and improved. With the knowledge that discharge against medical advice is a risk factor for suicide, clinicians and community services can monitor patients with an unplanned discharge more closely. Also, outpatient services can be more cautious when patients' key personnel are on leave or when some kind of discontinuity exists in their care. With extra precautions, we can start to prevent suicides that are occurring due to a change in postdischarge care.

Another important issue to consider is risk assessment. Clinicians should evaluate a patient's risk for suicide when preparing the patient for discharge from the hospital. The previously mentioned variables should be considered when deciding how much risk a patient has of attempting suicide in the postdischarge period. Although suicide is a rare and difficult-to-predict event, the knowledge gained from this review could have an impact on how risk is evaluated and possibly result in

more accurate assessment of patients at high risk for suicide after discharge from the hospital.

Disclosures

Dr. Links has received an unrestricted educational grant from Eli Lilly Canada, Inc. No other potential conflicts of interest relevant to this article were reported.

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