OBSTETRICS

Psychiatric risk factors associated with postpartum suicide attempt in Washington State, 1992-2001

Katherine A. Comtois, PhD; Melissa A. Schiff, MD, MPH; David C. Grossman, MD, MPH

OBJECTIVE: The purpose of this study was to evaluate preexisting psychiatric risk factors for postpartum suicide attempts resulting in hospitalization.

STUDY DESIGN: We performed a population-based case-control study using Washington State birth certificates linked to hospital discharge data to evaluate the association between hospitalization with a psychiatric diagnosis, substance use diagnosis, or dual diagnosis in the 5 years before delivery with risk of postpartum suicide attempt. We compared cases (n = 355) hospitalized postpartum for a suicide attempt with controls (n = 1420) by using multivariable logistic regression.

RESULTS: Women with a psychiatric disorder were at a 27.4-fold (95% confidence interval 10.6-70.8) increased risk, and those with a substance use disorder were at a 6.2-fold (95% confidence interval 2.8-13.9) increased risk, and those with a dual diagnosis were at an 11.1-fold (95% confidence interval 5.1-24.2) increased risk of postpartum suicide attempt compared with controls.

CONCLUSION: Prenatal screening for preexisting psychiatric or substance abuse diagnoses may help identify women at risk of postpartum suicide attempt.

Key words: attempted suicide, hospitalization, postpartum, pregnancy, psychiatric diagnosis, substance abuse

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A postpartum suicide attempt is a tragic event that may have serious long-term repercussions for the postpartum woman's family and her infant. A

From the Departments of Psychiatry and Behavioral Sciences (Dr Comtois) and Pediatrics (Dr Grossman), University of Washington School of Medicine, Seattle, WA; Harborview Injury Prevention and Research Center (Drs Schiff and Grossman); the Department of Epidemiology, University of Washington School of Public Health and Community Medicine (Dr Schiff); and the Center for Health Studies, Group Health Cooperative (Dr Grossman), Seattle, WA.

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★ EDITORS' CHOICE ★

recent study noted that 1 in 2277 women are hospitalized for a suicide attempt in the postpartum period.[1] Although prior psychiatric morbidity is a well-established risk factor for suicide and suicide attempt in the general population,[2-4] less is known about psychiatric risk factors for suicide attempt among postpartum women.

Women in the postpartum period can experience several affective, anxiety, and psychotic disorders, ranging in severity from the common "postpartum blues" experienced by 50-85% of mothers to postpartum psychosis with a prevalence of 0.2% among childbearing women.[5-6] Appleby and Turnbull[7] found that Danish women admitted to an inpatient psychiatric facility postpartum had a 70-fold increased risk of suicide in the year after birth and a 17-fold increased risk of suicide long-term compared with women in the general Danish population. To our knowledge, no prior population-based studies have evaluated the association between psychiatric morbidity before delivery and risk of suicide attempt postpartum. In light of this gap in knowledge, our objective was to perform a case-control study to examine the association between preexisting psychiatric risk factors for suicide attempts resulting in hospitalization in a statewide population of postpartum women.

MATERIALS AND METHODS

Study subjects

We performed a case-control study to evaluate the association between demographic characteristics and prior psychiatric diagnoses with hospitalized postpartum suicide attempts among women who had a live birth or fetal death from Jan. 1, 1992-Dec. 31, 2001, in Washington State. The hospital data were extracted from the Comprehensive Hospital Abstract Recording System (CHARS) from all Washington State nonfederal hospitals. Nonfederal hospitals include all hospitals in Washington State, except for military hospitals, which account for 4.7% of all deliveries in Washington State. The hospital discharge dataset and the Washington State death certificates were linked to the birth and fetal death

certificates, all identifiers were removed, and analysis was performed by using a deidentified dataset. This study was approved by the Washington State Institutional Review Board.

Cases included all women who were hospitalized for attempted suicide in the year after their live birth or fetal death during the 1992-2001 study period. Postpartum women who were hospitalized for attempted suicide were identified by linking the hospital discharge dataset containing all females with a hospitalization International Classification of Diseases, 9th revision, clinical modification (ICD-9-CM)[8] external causation or E-code 950-959 for attempted suicide to birth and fetal death certificates for the 364 days before the date of hospitalization. Hospitalization data for the 5 years before the index delivery were obtained for the cases. A control group consisted of postpartum women who had a live birth or fetal death during the study period and were not hospitalized for attempted suicide during the postpartum year. Hospitalization data for the 5 years before the index birth were obtained for controls. Controls were randomly selected from live birth and fetal death certificates from the same period in a ratio of 4 controls to 1 case. Controls were frequency matched to cases on year of live birth or fetal death. Women who died from nonsuicide related causes in the postpartum year were excluded from the control group because they were not at risk of suicide for the entire postpartum period.

Outcome classification

We used the ICD-9-CM E codes listed in the hospital discharge data and the death certificates to evaluate the method of suicide attempt. We classified method as poisoning by medications or other substances; cutting and piercing instruments; jumping from high place; crashing of motor vehicle; hanging; firearms; extremes of cold; and other methods (including jumping or lying before moving object, burns or fire, or other unspecified means. The specific ICD-9-CM E codes are available from the author on request. A prior study in Washington State[9] of injury hospitalizations compared CHARS with medical record review and found E-codes reported in CHARS to be reliable on mechanism and intent of injury including suicide.

Exposure classification

The primary exposures of interest for this study were demographic characteristics and psychiatric disorders preceding the delivery. Demographic characteristics we evaluated were maternal age, race/ethnicity, education, marital status, and insurance status, as recorded on the birth and fetal death certificates. Maternal age was categorized as less than 20 years, 20-34 years, and 35 years and older. Maternal race/ethnicity was categorized as non-Hispanic white, African-American, American Indian or Alaska Native, Asian or Pacific Islander, and Hispanic (regardless of race). Maternal education was categorized as completing less than high school, high school graduate, some college, and college graduate. Marital status was categorized as single or married. Type of medical insurance for the birth hospitalization was categorized as public funding (Medicaid, Medicare, or other program), private (any commercial third-party payer), and self-pay.

Psychiatric diagnoses, including substance use, were determined from ICD-9-CM diagnoses codes during hospitalizations as listed in the CHARS dataset in the 5 years before the index delivery. The CHARS dataset included up to 9 diagnosis codes and a woman was classified as having a prior psychiatric or substance use diagnosis if the ICD-9CM codes were included in any of the 9 diagnosis code fields for any hospitalization. Five years was selected as a period long enough for a significant psychiatric or substance use disorder to be identified.

Psychiatric diagnoses included mood disorders, psychotic illnesses, anxiety and hysteric disorders, personality disorders, and somatoform, hysteria, eating, impulse control, and adjustment. ICD-9-CM diagnoses of substance use disorders included either abuse or dependence on substances other than nicotine. The specific ICD-9-CM E codes are available from the author on request. Disorders of childhood, delirium, dementia or other cognitive disorders, and diagnoses caused by a general medical condition were not included in the psychiatric diagnosis category. Dual diagnosis was determined if there was at least 1 psychiatric and 1 substance use diagnosis during the same hospitalization in the previous 5 years.

Statistical analysis

We compared the demographic and obstetric characteristics of women hospitalized for postpartum suicide attempt with those of postpartum women with no history of hospitalization for suicide attempts. Obstetric characteristics that we evaluated were gravidity, parity, and trimester of initiation of prenatal care as recorded on the birth or fetal death certificate. Gravidity and parity were categorized as 1, 2, or 3 or more previous births. Trimester of initiation of prenatal care was categorized as first, second, or third trimester. We assessed proportions of mechanism of suicide attempt (using ICD-9-CM E-codes) among the women who attempted suicide.

We used logistic regression to estimate the odds ratios (OR) and 95% confidence intervals (CI) for the association between the demographic and psychiatric risk factors and postpartum suicide attempts. We initially included in our model those factors that were significantly associated with postpartum suicide attempt. Our final model only included demographic and psychiatric factors that remained significant after inclusion of all other factors. We adjusted our regression model for gravidity and infant or fetal death because we wanted to evaluate demographic and psychiatric risk factors independent of the obstetric factors. We have evaluated obstetric characteristics as independent risk factors in a prior analysis of postpartum suicide attempts.[1] We performed 2 subanalyses to evaluate the association between postpartum suicide attempt and (1) the number of prior hospitalizations for a psychiatric or substance use disorder in the prior 5 years as a measure of severity of prior psychiatric morbidity and (2) the timing of the prior hospitalizations in relation to date of delivery, categorized as less than 1 year, 1 to less

than 3 years, and 3-5 years before delivery. All statistical analyses were performed by using Stata 9.0 (Stata Corp, College Station, TX).

RESULTS

We found 355 women were hospitalized for a postpartum suicide attempt and they were more likely to be younger, black or American Indian/Alaska Native, unmarried, and of greater gravidity and parity compared with control women (Table 1). These women were also more likely to have public insurance and initiate prenatal care after the first trimester compared with controls. Cases were also less likely to be Hispanic and college graduates compared with controls.

Women who made postpartum suicide attempts used several different methods. The vast majority used medications for poisoning (88.7%), followed by cutting themselves (6.1%), hanging (0.3%), handgun (0.3%), extreme cold (0.3%), or crashed motor vehicle (0.3%). The method was unspecified in the hospital record in 4.0%.

More than a quarter (26.7%) of cases had been diagnosed with a psychiatric or substance use disorder or both during a hospitalization in the previous 5 years (10.4% [37/355] with a psychiatric disorder only, 7.3% [26/355] with a substance use disorder only, and 9.0% [32/355] with a dual diagnosis of a psychiatric and substance use disorder). In a multivariable analysis, we found that a prior hospitalization with a psychiatric diagnosis only was associated with a 27.4-fold increased risk, a hospitalization with a substance use disorder only was associated with a 6.2-fold increased risk, and dual diagnosis was associated with an 11.1-fold increased risk of postpartum suicide attempt (Table 2).

In our evaluation of severity of prior psychiatric morbidity as measured by number of prior hospitalizations, we found that women with 1 prior hospitalization with a psychiatric or substance use diagnosis had a 10.7-fold (95% CI, 6.5-17.5) increased risk and women with 2 or more prior hospitalizations with a psychiatric or substance use diagnosis had a 25.5-fold (95% CI, 11.8-55.2) in-

TABLE 1
Demographic and obstetric characteristics among postpartum women with and without a history of hospitalization for postpartum suicide attempt in Washington State, 1992-2001

Characteristics	Cases[a] n = 355 No. (%)	Controls[a] n = 1420 No. (%)
Maternal characteristics		
Age (y)		
$<$ 20	72 (20.3)	171 (12.0)
20-34	263 (74.1)	1056 (74.4)
35+	20 (5.6)	193 (13.6)
Race/ethnicity		
White	252 (73.3)	990 (72.2)
Black	26 (7.6)	69 (5.0)
American Indian or Alaskan Native	27 (7.8)	34 (2.5)
Asian/Pacific	21 (6.1)	85 (6.2)
Hispanic	18 (5.2)	183 (13.4)
Other	0	10 (0.7)
Education (y)		
$<$ High school	103 (34.0)	248 (19.4)
High school graduate	112 (37.0)	399 (31.3)
Some college	69 (22.8)	324 (25.4)
College graduate	19 (6.2)	305 (23.9)
Married		
Yes	158 (45.0)	1001 (70.6)
Insurance type		
Public	200 (56.3)	502 (35.4)
Private	136 (38.3)	845 (59.5)
Self-pay	19 (5.4)	73 (5.1)
Obstetric characteristics		
Gravidity		
1	81 (22.8)	484 (34.1)
2	93 (26.2)	405 (28.5)
3+	181 (51.0)	530 (37.4)
Parity		
1	108 (31.5)	579 (41.9)
2	98 (28.6)	469 (33.9)
3+	137 (39.9)	334 (24.2)
Trimester prenatal care initiated		
1	233 (74.0)	1107 (84.5)
2	65 (20.6)	170 (13.0)
3	17 (5.4)	33 (2.5)

[a] Some columns do not add to totals because of missing values.

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TABLE 2
Risk factors among postpartum women with and without a history of hospitalization for postpartum suicide attempt in Washington State, 1992-2001

Risk factors	Odds Ratio[a] (95% CI)
Age (y)	
> 35	1.0
20-34	2.4 (1.3-4.4)
< 20	3.8 (1.8-7.8)
Race/ethnicity	
White	1.0
Black	0.7 (0.3-1.3)
American Indian/Alaskan Native	2.0 (1.0-3.8)
Asian/Pacific	1.2 (0.6-2.1)
Hispanic	0.2 (0.1-0.4)
Education (y)	
College graduate	>1.0
Some college	2.3 (1.3-4.1)
High school graduate	2.7 (1.6-4.8)
< High school	3.9 (2.1-7.2)
Insurance type	
Private	1.0
Public	1.5 (1.1-2.1)
Self-pay	1.4 (0.7-2.7)
Hospitalization diagnosis	
None	1.0
Psychiatric disorder	27.4 (10.6-70.8)
Substance use disorder only	6.2 (2.8-13.9)
Both	11.1 (5.1-24.2)

[a] Adjusted for fetal or infant death and all other variables listed.

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creased risk of postpartum suicide attempt, independent of age, race/ethnicity, education, and insurance type, and fetal or infant death. Timing of prior hospitalization with a psychiatric or substance use diagnosis was associated with risk of postpartum suicide attempt. A hospitalization with a psychiatric or substance use diagnosis less than 1 year before delivery was associated with a 14.4-fold (95% CI, 6.2-33.8) increased risk, a hospitalization 1-3 years before delivery was associated with a 9.8-fold (95% CI, 4.8-19.7) increased risk and a hospitalization 3-5 years before delivery was associated with a 9.9-fold (95% CI, 3.4-28.9) increased risk of postpartum suicide, independent of age, race/ethnicity, education, and insurance type, and fetal or infant death.

COMMENT

In this population-based case-control study, we found a significantly increased risk of postpartum suicide attempts among women with a psychiatric disorder or substance use or a dual diagnosis during prior hospitalizations. Women with more than 1 prior hospitalization with psychiatric or substance use diagnosis were at a marked increased risk.

Our finding of increased risk of postpartum suicide attempt among women with a prior diagnosis of psychiatric disorder or substance use is similar to findings from other research. Kessler et al[10] reported that among the maternal deaths caused by suicide in the United Kingdom from 1997-1999, a significant proportion of the women had a psychiatric disorder. Many studies in the nonpregnant population have found that the majority of those who attempt suicide had a psychiatric diagnosis at the time of the attempt.[2-4] The presence of multiple psychiatric diagnoses concurrently has also been found to be an independent risk factor for suicide attempts.[10] Substance use has also been associated with risk of suicide attempt.[11,12] We found that women with 2 or more hospitalizations were at increased risk of postpartum suicide attempt compared with women with only 1 prior hospitalization similar to findings in a prior study of completed suicide in the general population.[13] Multiple prior hospitalizations may be a surrogate measure for a more severe or persistent disorder that is associated with increased risk. In addition, the risk of postpartum suicide attempt was greater among women with a hospitalization with a psychiatric or substance abuse diagnosis less than 1 year before delivery compared with women with a hospitalization 1-3 years or 3-5 years before delivery, similar to a prior study of completed suicide in the general population.[13]

This study is subject to several limitations. First, our cases and controls may have had a psychiatric disorder treated in the outpatient setting and were never hospitalized. In addition, some cases and controls with psychiatric disorders may have been hospitalized for medical conditions but their psychiatric disorders were not documented in the CHARS dataset. Both of these misclassifications of a psychiatric diagnosis would likely be nondifferential and result in our results being biased toward the null.Because our dataset was based on birth certificate records rather than population lists, it is possible that some women who delivered in Washington State were not in the state during the entire 5 years before

their delivery. We would have missed their hospitalizations before their move to Washington State. We did not have information on the cases' intent to die because our study used an administrative dataset for analysis. Despite this limitation, we believed that the majority of cases in this study involved at least some intent to die because the severity of the attempt required admission to the hospital.

Postpartum suicide attempt is a rare event. In our previous study of postpartum suicide,[1] we evaluated maternal complications and adverse infant outcomes as risk factors for postpartum suicide attempt. In the current study, we focused on preexisting psychiatric risk factors for postpartum suicide attempts resulting in hospitalization. Most importantly, a prior psychiatric or substance use diagnosis among postpartum women markedly increased the risk of a serious postpartum suicide attempt. One implication of this study is that screening for past history of psychiatric and substance use diagnoses as part of routine prenatal care may be a means of identifying women at high risk of postpartum suicide attempt, although a recent review prenatal screening for depression cited insufficient evidence to recommend screening as a way to improve outcomes.[14] The American College of Obstetricians and Gynecologists recently recommended screening for psychosocial risk factors, including depression during prenatal care.[15] In addition, postpartum women with current or past psychiatric diagnoses or substance use may require more careful follow-up postpartum by obstetricians, pediatricians, and primary care providers. Future studies should evaluate the effectiveness of screening for psychiatric and substance use disorders on decreasing adverse outcomes such as suicide attempts during the postpartum period. If found to be effective, such interventions may prevent the devastating impact associated with postpartum suicide attempt. ■

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