Rates and Relative Risk of Hospital Admission Among Women in Violent Intimate Partner Relationships

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A B S T R A C T

Objectives. This study assessed the history of hospitalization among women involved in violent intimate relationships.

Methods. In this 1-year retrospective cohort study, female residents of King County, Washington, who were aged 18 to 44 years and who had filed for a protection order were compared with nonabused women in the same age group. Outcome measures included overall and diagnosis-specific hospital admission rates and relative risk of hospitalization associated with abuse.

Results. Women known to be exposed to a violent intimate relationship were significantly more likely to be hospitalized with any diagnosis (age-specific relative risks [RRs] ranging from 1.2 to 2.1), psychiatric diagnoses (RR = 3.6, 95% confidence interval [CI] = 2.8, 4.6), injury and poisoning diagnoses (RR = 1.8, 95% CI = 1.2, 2.8), digestive system diseases (RR = 1.9, 95% CI = 1.3, 2.9), and diagnoses of assault (RR = 4.9, 95% CI = 1.1, 22.1) or attempted suicide (RR = 3.7, 95% CI = 1.6, 9.2) in the year before filing a protection order.

Conclusions. This study showed an increased relative risk of both overall and diagnosis-specific hospitalizations among abused women. Intimate partner violence has a significant impact on women's health and use of health care. (*Am J Public Health.* 2000;90:1416–1420)

Up to 4 million incidents of intimate partner violence occur annually in the United States; women are 10 times more likely than men to be victimized.[1–4] The National Crime Victimization Survey estimated that 52% of women victimized by an intimate partner sustain injuries, with 30% to 40% of these women requiring medical care and 15% requiring hospitalization.[3,5] The health care system repeatedly has been identified as an important point of contact for the identification and referral of victims of intimate partner violence.[6–12]

Previous studies based in clinical settings have shown battered women to be at increased risk of emergency visits and hospitalization for both somatic and psychiatric diagnoses.[13–17] Bergman and Brismar[13] and Stark et al.[14] found that battered women evidenced greater medical care use than nonabused women for the periods both before and after the index episode of abuse. Psychiatric symptoms consistent with diagnoses of major depression,[18–22] anxiety and insomnia,[18,19,21] alcohol abuse or dependence,[20,21] and posttraumatic stress disorder[21,23–25] have been reported to be more prevalent among battered women. Physical problems reported to a greater degree by battered women include injuries as well as vague somatic symptoms and complaints (e.g., frequent headaches, loss of appetite, chest pain).[14,18,19] Because the samples of battered women taking part in these studies were derived from clinical settings, the results may not be generalizable to all battered women. Furthermore, calculation of population-based rates of health care use has not been possible.

The aim of the current study was to determine the rates of nonobstetric hospital admissions among adult female residents of King County, Wash, who had been exposed to a violent intimate relationship, in comparison with rates for women not known to have been abused. In addition, we focused on hospitalizations for the specific diagnoses previously found to be associated with intimate partner violence: injury; mental disorders; suicide attempts; assaults; symptoms, signs, and ill-defined conditions; and gastrointestinal disorders. Our use of a large population-based sample allowed the calculation of hospital admission rates and relative risk (RR) of hospitalization and enabled detailed analyses by diagnostic categories.

Methods

Study Population

In this retrospective cohort study, female residents of King County who were aged 18 to 44 years and had filed for a temporary or permanent order of protection in district or superior court in King County in 1992 were considered exposed to intimate partner violence. This cohort was identified through a population-based database. Specifically, we used a surrogate measure of exposure to intimate partner violence—namely, court records of protection orders—on the assumption that women who file for protection orders have a preexisting history of this type of abuse. Spousal or intimate partner relationships were defined as including married spouses, intimate cohabitants, persons with a child in common, and dating relationships.

The comparison group consisted of female residents of King County aged 18 to 44 years in 1991 who had not filed for a protection order. A 10% random sample of hospitalizations and a corresponding 10% sample of the 1990 census (n = 36 532) were used to

calculate the numerator and denominator of the comparison group, respectively.

Data Sources and Linkage

The study protocols were approved by the University of Washington's Human Subjects Committee. The study measures taken to protect subject confidentiality included password protection of study data files, removal of identifiers following data linkage, and data access provided only to authorized study personnel who had signed a confidentiality agreement. We identified 1468 eligible subjects from court data. The records of 113 subjects did not include sufficient identifying information to allow linkage of court and hospital data and were excluded. Linkage was performed with an identifier composed of the victim's date of birth and truncated name. Of the 1355 women with sufficient data for linkage, 173 (12.8%) were matched to hospitalization records.

The filing date of the protection order served as the index date for the abused group. Data were available on type of abuse experienced by women who filed protection orders in district court. We defined severe acts of violence as any of the following events reported in the protection order application: choking, imprisonment, sexual abuse/rape, striking with objects, use of weapons, and withholding food, medication, and/or sleep.

Hospitalization data were obtained from 1991–1992 Washington State Comprehensive Hospital Abstract Reporting System records to provide 1 year of data for the exposed group. This reporting system contains data on all inpatient stays for nonmilitary acute care hospitals within Washington State. The system data set contains up to 5 diagnostic codes per hospitalization, with prioritization of codes based on hospital-specific policies.

Because of potential lack of conformity in prioritization of the diagnosis codes, and in an effort to capture comorbidity, we defined hospitalizations for specific diagnostic groups as those in which any of the 5 diagnostic codes were present. Specific diagnostic groups evaluated included mental disorders; diseases of the digestive system; symptoms, signs, and ill-defined conditions; injury and poisoning; attempted suicide (external-cause-of-injury code [E-code]); and assault (E-code). Diagnostic groups were formed according to *International Classification of Diseases, Ninth Revision* (*ICD-9*) 3-digit categories with the exception of the mental disorders diagnostic category, from which codes 317 to 319, representing diagnoses related to mental retardation, were omitted.

Hospitalizations of abused women were limited to those occurring among residents of King County, ascertained through residential zip codes obtained from hospitalization data, in order to be consistent with the sampling of

nonabused subjects. In the comparison group, hospitalization histories within King County were evaluated for calendar year 1991; hospitalizations were limited to those occurring among residents of the county.

Data Analysis

Hospital admission rates, defined as total number of hospital admissions (including multiple admissions for the same individual) divided by person-time at risk, were calculated for the abused and nonabused groups for all diagnoses and by diagnosis-specific categories. Rates for the nonabused group for calendar year 1991 were used as referent rates. Overall hospitalization history and diagnosis-specific hospitalization history within King County were evaluated for the abused subjects for the entire year preceding the protection order date, as well as for the smaller intervals of 12 months to 6 weeks preceding the index date and the 6 weeks preceding the index date. We analyzed these periods separately to account for the effects on relative risks of hospitalizations occurring just before protection order filing.

Because of the primary interest in injury and mental health diagnoses, analyses of the subgroups within these categories were also performed. Mantel–Haenszel estimation was used in adjusting relative hospitalization rates for age when cell sizes permitted. Poisson regression was also performed for diagnostic groupings with significantly elevated relative risks. The significance level for the analyses was set at .05.

Results

Demographics and Abuse History

Age distributions for the abused and nonabused women are presented in Table 1. Abused women were slightly younger than comparison group members (mean ages were

30.3 and 30.9 years, respectively). Race distributions for women identified from district court records (data were not available from superior court) and comparison group women were very similar (86.6% and 84.4% White, respectively).

Additional data available on the women who filed for a protection order in district court indicated that 90.5% reported a history of physical abuse by the abuser preceding the index episode (the abusive episode that led to the filing of the protection order), 73.1% reported that the police had been contacted for an incident occurring before the index incident, and 54.3% reported having experienced severe acts of violence (e.g., struck with an object, choked, assaulted with a weapon). District court data also indicated that 15.8% of the women had been involved in a relationship with the abuser lasting less than 1 year; 54.4%, between 1 and 5 years; 19.3%, between 5 and 10 years; and 10.5%, more than 10 years.

Hospitalization Data

Among women in the abused group, 236 hospitalizations occurred in the 1355 woman-years at risk in the year preceding the filing of the protection order (174 per 1000 woman-years), compared with 4231 hospitalizations in the 36 532 woman-years at risk among nonabused women (116 per 1000). The abused women filing in district court and superior court had comparable overall rates of hospitalization (190 per 1000 and 170 per 1000 woman-years, respectively). Poisson analysis indicated a significant interaction between age and abuse for the any hospitalization category but not for diagnosis-specific hospitalizations. For the abused group relative to the comparison group, risks of any hospitalization were 2.1 (95% confidence interval [CI]=1.7, 2.7) among those aged 18 to 24 years, 1.4 (95% CI=1.1, 1.7) among those aged 25 to 34 years, and 1.2 (95% CI=0.9, 1.6) among those aged 35 to 44 years.

TABLE 1—Characteristics of Study Subjects: King County, Wash, 1991–1992

Characteristics	District Court Subjects (n=337), No. (%)	Superior Court Subjects (n=1018), No. (%)	Nonabused Subjects (n=36 532), No. (%)
Age, y*			
18–24	87 (25.8)	222 (21.8)	7 612 (20.8)
25–29	77 (22.8)	237 (23.3)	7 315 (20.0)
30–34	88 (26.1)	260 (25.5)	7 848 (21.5)
35–39	60 (17.8)	192 (18.9)	7 299 (20.0)
40–44	25 (7.4)	107 (10.5)	6 458 (17.7)
Race[a]			
White	284 (86.6)	. . .	30 842 (84.4)
Non-White	44 (13.4)	. . .	5 690 (15.6)

[a]Excludes 9 subjects with unknown race.
*$P<.001$ (in comparison of combined exposed group and comparison group).

TABLE 2—One-Year Hospital Admission Rates per 1000 Woman-Years and Relative Risks of Hospitalization, by Diagnostic Category: King County, Wash, 1991–1992

ICD-9 Diagnostic Category	Abused Women (n = 1355)		Nonabused Women (n = 36 532)		Relative Risk (95% Confidence Interval)
	No.	Rate	No.	Rate	
Any diagnosis, by age, y[a]					
18–24	76	246	885	116	2.1 (1.7, 2.7)[c]
25–34	105	159	2134	141	1.4 (1.1, 1.7)[c]
35–44	55	143	1212	88	1.2 (0.9, 1.6)
Mental disorders (codes 290–316)	58	42.8	443	12.1	3.6 (2.8, 4.6)[c]
Diseases of the digestive system (codes 520–579)	25	18.5	355	9.7	1.9 (1.3, 2.9)[c]
Symptoms, signs, and ill-defined conditions (codes 780–799)	18	13.3	300	8.2	1.6 (1.0, 2.6)
Injury and poisoning (800–999)	21	15.5	327	9.0	1.8 (1.2, 2.8)[c]
Suicide attempt (E-codes 950–959)	5	3.7	36	1.0	3.8 (1.6, 9.2)[c]
Assault (E-codes 960–969)	2	1.5	11	0.3	4.9[b] (1.1, 22.1)[b,c]

[a]Relative risks reported for any hospitalization are based on results from Poisson analyses that accounted for a significant interaction between age and exposure.
[b]Crude relative risk (cell sizes were too small to permit adjustment by age); all others are age adjusted.
[c]$P < 0.05$

TABLE 3—Relative Risk of Hospital Admission, by Diagnostic Category and Time Period: King County, Wash: 1991–1992

ICD-9 Diagnostic Category	1 Year to 6 Weeks Before Index Date, Relative Risk (95% Confidence Interval)	6 Weeks Before Index Date, Relative Risk (95% Confidence Interval)
Any diagnosis, by age, y[a]		
18–24	2.1 (1.6, 2.7)	2.2 (1.1, 4.2)
25–34	1.4 (1.1, 1.7)	1.4 (0.8, 2.4)
35–44	1.2 (0.9, 1.6)	1.6 (0.8, 3.1)
Mental disorders (codes 290–316)	3.3 (2.5, 4.5)	5.4 (3.1, 9.4)
Diseases of the digestive system (codes 520–579)	1.9 (1.2, 2.9)	2.0 (0.6, 6.2)[b]
Symptoms, signs, and ill-defined conditions (codes 780–799)	1.6 (1.0, 2.7)	1.6 (0.4, 6.3)[b]
Injury and poisoning (codes 800–999)	1.6 (1.0, 2.6)	3.0 (1.2, 7.6)
Suicide attempt (E-codes 950–959)	1.7 (0.4, 7.0)[b]	19.5 (6.0, 63.5)[b]
Assault (E-codes 960–969)	. . .	42.6 (9.5, 192.3)[b]

[a]Relative risks reported for any hospitalization are based on results from Poisson analyses that accounted for a significant interaction between age and exposure.
[b]Crude relative risk (cell sizes were too small to permit adjustment by age); all others are age adjusted.

Diagnosis-specific hospital admission rates and relative risks are shown in Table 2. In comparison with nonabused women, women obtaining protection orders had significantly higher rates of hospital admissions in the previous year for mental disorders, diseases of the digestive system, and injury and poisoning. The abused group also had a nearly 4-fold risk of hospital admissions in which a suicide attempt or assault was coded. Poisson analyses yielded virtually identical risk estimates.

Relative risks of any hospitalization were found to be comparable for the 2 separate time periods in the year preceding the protection order (Table 3). The relative risk for hospitalization with a diagnosis in the injury and poisoning category was 1.6 for the 12 months to 6 weeks before the filing of a protection order. This risk nearly doubled in the 6 weeks before the protection order was filed (RR=3.0).

The relative risk estimates for proportions of women hospitalized with ICD-9 diagnoses within the mental disorders category were large (3.3 and 5.4) and significant across the 2 time periods (see Table 3). Evaluation of the mental disorders subcategories revealed a significantly elevated relative risk of hospitalization in the year preceding the index date for psychoses other than organic psychoses (RR=2.9, 95% CI=1.8, 4.5) and for neurotic, personality, and other nonpsychotic mental disorders (RR=4.1, 95% CI=3.3, 5.0). The crude rela-

tive risk estimates for hospitalizations resulting from suicide attempts were 1.7 (95% CI=0.4, 7.0) and 19.5 (95% CI=6.0, 63.5) for the 12 months to 6 weeks before the index date and the 6 weeks before the index date, respectively. Among women in the abused group, only 2 hospital admissions involved an assault-related E-code, and both occurred within the 6 weeks preceding filing of the protection order (RR=42.6, 95% CI=9.5, 192.3 for this time period).

Table 4 presents the crude relative risk estimates for diagnostic subcategories of injury and poisoning hospitalization in the year before the index date. Only subcategories for which an elevated relative risk was obtained are presented, whether or not the confidence interval included unity. Abused women had elevated hospital admission rates in 9 of the 24 injury and poisoning subcategories. The strongest finding was a 9-fold relative risk of hospital admission with a diagnosis of contusion (95% CI=2.9, 27.9). Relative risks of hospital admission for contusions were 7.6 (95% CI=2.1, 27.0) and 19.5 (95% CI=2.5, 150.2) for the 12 months to 6 weeks before filing and the 6 weeks before filing, respectively.

Discussion

The current study of population-based hospitalization rates shows that women who filed for a protection order against a male intimate partner had an overall increased risk for earlier hospitalization relative to women not known to have been abused. These population-based findings corroborate those of smaller hospital-based studies and provide the first information on hospitalization among abused

TABLE 4—Injury and Poisoning Diagnostic Subcategory: 1-Year Hospital Admission Rates per 100 000 Woman-Years and Relative Risks: King County, Wash: 1991–1992

	Abused Women (n = 1355)		Nonabused Women (n = 36 532)		
	No.	Rate	No.	Rate	Relative Risk (95% Confidence Interval)
Injury and Poisoning (Codes 800–999)	21	15.5	327	9.0	1.7 (1.1, 2.7)
Dislocation (codes 830–839)	1	0.7	14	0.4	1.9 (0.3, 14.7)
Sprains and strains of joints and adjacent muscles (codes 840–848)	2	1.5	32	0.9	1.7 (0.4, 7.0)
Intracranial injury, excluding those with skull fracture (codes 850–854)	1	0.7	7	0.2	3.9 (0.5, 31.3)
Open wound of head, neck, and trunk (codes 870–879))	1	0.7	6	0.2	4.5 (0.5, 37.3
Open wound of upper limb (codes 880–887)	2	1.5	14	0.4	3.9 (0.9, 17.0)
Contusion with intact skin surface (codes 920–924)	4	3.0	12	0.3	9.0 (2.9, 27.9)
Poisoning by drugs, medicinals, and biological substances (codes 960–979)	4	3.0	39	1.1	2.8 (1.0, 7.7)
Other and unspecified effects of external causes (codes 990–995)	1	0.7	3	0.1	9.0 (0.9, 86.4)
Complications of surgical and medical care, not elsewhere classified (codes 996–999)	6	4.4	135	3.7	1.2 (0.5, 2.7)

Note. All relative risks are crude relative risks.

women.[6,13,14] Like Brismar et al., who noted a 50% relative increase in somatic illness hospitalizations,[6] we found that abused women had a 50% relative increase in hospitalization rate for any diagnosis in comparison with women in the nonabused group. In addition, we found that this relative risk differed significantly by age, with the association between abuse and risk of hospitalization for any diagnosis greatest among women in the younger age groups.

Specifically, the abused women in our study had an increased relative risk of hospitalization for assault, mental disorders, attempted suicide, injury and poisoning, and digestive system diagnoses. The relative risk estimates for psychiatric diagnoses found in this study were somewhat lower than those of Stark et al.[14] Whereas Stark et al. found that abused women were 5 times as likely as nonabused women to have psychiatric emergency visits, we found a relative risk of 3.6 for hospitalization with psychiatric diagnoses associated with abuse. The more conservative findings in our study are not surprising, however, given that we measured rates of hospitalization rather than rates of emergency services, as in the Stark et al. study.

In this study, as in previous research,[14–17,26] suicide attempts were found to be much more frequent among abused women. We cannot say definitively from this study whether abuse preceded these attempts, but others have provided evidence to that effect.[17] In addition, elevated relative rates of hospitalizations for poisonings were found, particularly in the 6 weeks before the index date; these may have been miscoded suicide attempts. An association between his-

tory of abuse and gastrointestinal disorders has been suggested in the literature[27,28] but had not previously been evaluated specifically among battered women. Evidence from this study suggests an increased relative risk of gastrointestinal disorders among abused women.

Because we were taking advantage of the opportunity to use a computerized population-based database, the filing of a protection order by a woman against a current or former intimate male partner served as the surrogate measure for identifying women exposed to an abusive intimate partnership. The potential limitations of using this method of exposure ascertainment are the restricted generalizability of the results and potential misclassification of exposure. If abused women who file for a protection order differ from abused women who do not file for a protection order on a particular factor (e.g., more serious level of violence experienced, help-seeking behaviors), and that factor is also positively related to hospitalization, our relative risks will be overestimates of the true risk associated with abuse by an intimate partner.

However, preliminary results from another study we conducted, in which abused women in Seattle, Wash, who had filed a protection order were compared with abused women who had not filed a protection order (both with a history of police-reported intimate partner violence), indicated that the 2 groups had similar demographic profiles and abuse histories, providing evidence that our results are generalizable beyond the subset of women who obtain a protection order.[29] Because our exposed group was limited to abused women who filed for a protection order, it is likely that

our comparison group contained some women who were abused. This type of misclassification would lead to results that slightly underestimate the true risk of hospitalization associated with abuse.

Measurement of exposure in this study relied on an event that occurred after the outcomes of interest, which necessitates addressing 2 additional concerns. First, the true exposure of interest was exposure to a violent intimate relationship. It was not known in each individual case whether the first violent episode preceded the hospitalization. However, using data available on district court petitioners, we found that 84.2% of those hospitalized had been involved in the relationship at least 1 year, and 29.8% had been in the relationship for 5 or more years, reassuring us that the vast majority had been in the abusive relationship before hospitalization.

Furthermore, more than 90% of district court petitioners reported a history of abuse preceding the episode that led to the filing for a protection order. Although these data were not available for women filing in superior court, petitioners are required to file in superior court if another civil action (e.g., divorce, child custody) is taking place between the petitioner and respondent concurrent with the filing of the protection order. Thus, because they were married to or had children in common with the abuser, it is likely that most of the women filing in superior court had been involved in the relationship at least 1 year. In addition, another study that we conducted showed that the first emotional and/or physical abuse experienced by women filing for protection orders against a current or recently estranged male partner

occurred, on average, 4 years before filing, thereby providing further evidence that abuse exposure most likely preceded outcome status among the subjects of the current study.[29]

Lack of information on sex and type of relationship for superior court petitioners also made it impossible to remove male petitioners and petitioners with other than an intimate relationship with the respondent from the denominator of the abused group. On the basis of district court data, we estimate that these groups represented less than 9% of the petitioners. This possible misclassification would result in an underestimation in relative risk of approximately 10%.

Information on socioeconomic status was not available for all subjects; thus, this variable was not controlled for in the analysis, possibly biasing the risk estimates obtained. Confounding due to socioeconomic status would probably result in overestimations of the effects of abuse, because both abuse and hospitalization tend to be negatively associated with income. We believe it unlikely, however, that confounding by socioeconomic status explains much of the excess risk we witnessed. The reason is that the diagnostic categories with consistently and significantly elevated relative risks among the abused women were those postulated to be of particular interest on the basis of the literature on battered women. Significant increases in hospitalization for diagnostic categories unrelated to abuse were not seen (data not shown).

The second concern was the potential for selection bias with particular regard to outcomes occurring immediately before the time of filing. For example, the rate of injury among abused women might be higher than that among nonabused women, not as a result of involvement in a battering relationship but because the injury was the event that led the subject to obtain the protection order. To address this point, we evaluated the rates of hospitalization for the year preceding the protection order, excluding the 6 weeks just before that filing. Relative risk estimates for hospital admissions for any diagnosis, mental disorders, and diseases of the digestive system all remained similar in magnitude and significantly elevated.

The current study builds on the existing literature with a study design that involved a population-based sample of abused women, allowing calculation of hospitalization rates and comparison with rates from the underlying population. The large sample size provided us with sufficient statistical power to examine hospitalization rates by diagnostic subgroup. Although this study does not provide an indication of comprehensive health care use among abused women, it offers insight into the rates of serious illnesses and injuries that result in hospitalization for these women. Women who filed for protection orders against their abusers constituted an identifiable group of abused women that allowed us to determine the rates and relative risks of hospitalization associated with this exposure. It is likely that women who file for a protection order represent a small minority of all women abused by intimate partners; therefore, the absolute magnitude in regard to public health impact is likely to be much larger than we have reported. □

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