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Factors associated with sexual assault and time to presentation

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Abstract

Objective—Delay to medical care after sexual assault can be associated with adverse consequences for the assault survivor. Few studies examine factors associated with timely presentation to care after sexual assault. Using data from the Massachusetts Sexual Assault Nurse Examiner (SANE) program, we examine sexual assault and survivor characteristics and their association with time to presentation after sexual assault.

Method—Cross-sectional data were collected during forensic exam for all patients presenting to 24 SANE-affiliated hospitals in Massachusetts between July 2003 and June 2005. Data included patient demographics, assailant information, and assault characteristics. A Cox proportional hazards model described factors associated with delayed presentation for post-assault care.

Results—478 females presented to SANE hospitals over two years. 66% were white, non-Hispanic; 14% Hispanic and 13% black; 39% were between 18 and 24 years old. The median time from onset of assault to presentation was 16 hours. In multivariable analysis, assault by a known assailant was associated with delayed presentation (hazard ratio=0.71, 95% confidence interval=0.57, 0.88.)

Conclusion—Most women who present for exam following sexual assault do so expeditiously. If an assailant is a family member or date, a woman is more likely to delay post-assault care. These findings can inform public health interventions.

MESH Headings

rape; sexual assault; women; forensic medicine; domestic violence

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Introduction

Lifetime prevalence of rape is 18% among US adult women, with annual prevalence between 0.3 (Tjaden and Thoennes, November 1998) and 1.1% (Moracco et al., 2007). Few rape survivors seek immediate medical attention, even with serious injury (Tjaden and Thoennes, November 1998). Delayed presentation may result in loss of forensic evidence and postpones treatment for sexually transmitted infections, postexposure prophylaxis for HIV, and emergency contraception, which are maximally effective if given early after assault (Resnick et al., 2000). Rape sequelae include illness and increased healthcare utilization (Suris et al., 2004). Medical care early after sexual assault may reduce these sequelae (Resnick et al., 2000).

Little prior data describes factors associated with delay to presentation for post-assault care. Prior study has retrospectively compared those who engage in post-assault medical care to non-presenters (Resnick et al., 2000). In a single institution study (Millar et al., 2002), severe assault and an unknown perpetrator were associated with earlier presentation.

Under Massachusetts law, medical providers treating sexual assault survivors must complete an anonymous forensic encounter form (Fallon et al., 2006). In Massachusetts, Sexual Assault Nurse Examiners (SANEs) complete at least 24% of these encounter forms, (Fallon et al., 2006) covering 24 hospital emergency rooms. SANEs are more likely than non-SANE providers to provide post-assault STD prophylaxis and emergency contraception (Campbell et al., 2005). SANEs collect higher quality forensic evidence. When cases are prosecuted, SANE exams are associated with more convictions (Campbell et al., 2005). SANE care may be psychologically beneficial to sexual assault survivors (Campbell et al., 2005).

Using data from the Massachusetts SANE program, we describe characteristics of the assault, assailant and survivor, and examine the association of these characteristics with time to presentation after sexual assault.

Methods

Our sample included all subjects for whom a forensic encounter form was submitted by a SANE for the two-year period from July 2003 through June 2005. We limited analyses to female assault survivors age 12 and older.

Dependent variable: Time to presentation was measured as the difference in hours between assault time and date and time and date of presentation for SANE exam, recorded on the forensic encounter form.

Independent Variables: Age was categorized based Massachusetts Rape Crisis Center groupings as 12-17, 18-24, 25-60 and greater than 60 years. Assault survivors reported number of assailants and relationship of the assailant to the survivors (stranger, family member, or date or acquaintance.)

We created dichotomous variables based on theoretical (common characteristics) and statistical (cells with small numbers) factors: race/ethnicity (white, non-Hispanic versus nonwhite); age (teenage [ages 12-17] versus adult [18 or older]), relationship of the assailant to the survivor (known [family, date or acquaintance] versus unknown), severe violence (beating, physical restraints, burns, bites or use of a weapon versus none), verbal threats (versus none), intoxicant exposure (voluntary or involuntary use of intoxicants including alcohol versus none), assault surroundings (home or dorm versus another location), and multiple assailants (greater than one versus one).

Statistical analyses

We computed frequencies for categorical data. For continuous variables, we computed means with standard deviations for parametric and medians with interquartile ranges for nonparametric distributions.

We used the Cochran-Mantel-Haenszel chi-square test to perform bivariate tests of whether pertinent assault characteristics (severe violence, verbal threats, intoxicant exposure, assault surroundings, and multiple assailants) differed by age or race/ethnicity of the assault survivor, or by the relationship of the assailant to the survivor.

To determine the factors associated with time to presentation after sexual assault, we performed bivariate comparisons of median time to presentation using the Wilcoxon Rank Sum. A Cox proportional hazards model described independent factors associated with time to presentation. A decreased hazard ratio for presenting to the emergency department is indicative of a relative delay in presentation among those who are positive relative to those who are negative on a given factor.

Our final model included prespecified demographic criteria (age and race/ethnicity) and all variables with $p < 0.10$ in bivariate analyses. To confirm the robustness of our variable selection, we used multiple selection procedures including stepwise (entry criterion $p < 0.05$, retention criterion $p < 0.10$), backwards (retention criterion $p < 0.10$), and best subsets selection. Although assault in a house or dorm was significant in bivariate analysis, we excluded this from the multivariable model due to high association with the known assailant variable ($\chi^2 = 54$, $p < 0.001$). All analyses were performed using SAS software, Version 9 (SAS Institute, Cary, NC).

Results

During the two year interval, 478 SANE forensic encounter forms were filed on women. Assault characteristics are shown in Table 1.

In bivariate associations, 55% of those who reported a known assailant reported severe violence, compared to 44% of those who did not know their assailant ($p < 0.01$). Teenagers (age 12-17) were more likely to be assaulted by more than one assailant compared to adults, (OR=2.15, 95% CI=1.28, 3.62). Subjects assaulted in a house or dorm were more likely to know their assailant (OR=4.07, 95% CI=2.73, 6.07). None of the remaining bivariate associations were significant.

Time to presentation data were available for 392 subjects. There were no significant differences in assault characteristics or demographics between these 392 subjects and those for whom time to presentation data were not available. The median time to presentation was 16 hours; 95% presented within 72 hours.

Analysis of bivariate comparisons of median time to presentation by potential explanatory variables yielded the following: severe violence was associated with earlier presentation (median time 13 hours versus 17 hours among those not reporting severe violence, $p < 0.01$), verbal threats were associated with earlier presentation (10 hours versus 17 hours, $p < 0.01$.) Intoxicant exposure (18 hours versus 14 hours, $p < 0.05$) and assault at home (16 hours versus 12 hours, $p < 0.05$) were associated with later presentation. A known assailant was suggestive of an association with later presentation (17 hours versus 15 hours, $p = 0.056$). White, non-Hispanic race/ethnicity, teenage status, penetration, ejaculation, condom use, and multiple assailants were not significantly associated with time to presentation.

Table 2 shows multivariable analysis for time to presentation. A known assailant was associated with delayed presentation to the emergency department, and verbal threats were associated with earlier presentation. The remaining covariates were not independently associated with time to presentation.

Discussion

Among women who present for SANE evaluation following sexual assault in Massachusetts, most do so expeditiously. Most of our sample would be eligible for collection of forensic evidence, emergency contraception (Resnick et al., 2000), and HIV chemoprophylaxis (Smith et al., 2005), all recommended within 72 hours of sexual assault. This is important given the high rates of body cavity penetration and ejaculation and low rate of condom use among perpetrators in this cohort.

The high rate of severe violence (55%) reported by subjects who knew their assailants contests the conventional view that severe violence is associated with stranger assault (Stermac et al., 1995). However, need for medical care due to severe violence may differentially increase presentation for care among subjects who know their assailants. Concordant with prior report, (McDermott et al., 2008, Resnick et al., 2000) our data indicate that a majority of assault survivors knew their assailant.

Study limitations and strengths

Our data have several limitations. Providers may underreport treatment of sexual assault survivors. These data reflect a portion of those sexual assault survivors who present for post-assault care, and may not be generalizable to survivors who present to non-SANE hospitals or who do not present for immediate care.

Older persons are underrepresented in our data (2% over age 60) compared to census data for Massachusetts in 2005 (12%). However, the frequency of sexual assault among older persons in our study is similar to previous data (Zink and Fisher, 2006), and consistent with prior report that younger individuals are disproportionately likely to be sexually assaulted (McDermott et al., 2008). Frequency of Black (13%) or Hispanic (14%) race/ethnicity is identical to census data. Our data indicate a lower rate of intoxicant exposure (16%) compared to an Irish sample (32%, McDermott et al., 2008).

The strongest independent predictor of delay to presentation was a known assailant. These data are a logical extension of prior report that women assaulted by intimates are less likely to ever seek medical care (Resnick et al., 2000).

Conclusions

Because most sexual assailants are known to survivors, delaying care among those who know their assailant reflects a substantial public health risk. Preventive efforts must include public health campaigns to better inform survivors that assault by a known assailant is a crime, and early access to medical care may mitigate adverse outcomes.

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Table 1

Females presenting to Massachusetts Emergency Rooms, SANE(a) Forensic Encounter Form, 7/03-6/05

	N=478	%
Age		
12-17	132	28
18-24	185	39
25-59	153	32
60+	8	2
Race/Ethnicity		
White, Non-Hispanic	317	66
Hispanic	67	14
Black	60	13
Asian	9	2
Other/Unsure	25	5
Assault Location		
House/Dorm	310	65
Outdoors	64	13
Other/Unsure	104	22
Region (N=465)		
Boston	126	27
Central	11	2
Northeast	61	13
Southeast	179	38
Western	88	19
Penetration	471	99
Ejaculation	467	98
Severe Violence	217	45
Verbal Threat	137	29
Intoxicant Exposure	76	16
More than 1 assailant		
Yes	76	16
No	337	71
Unknown	65	14
Perpetrator Relationship		

	N=478	%
Stranger	158	33
Family	23	5
Acquaintance/Dated	238	50
Other/Unsure	59	12
Condom Use		
yes	64	13
no	234	49
unsure/unknown	180	38
	Median	IQR (b)
Hours to ED (c) Presentation (n=392)	15.5	6.08-31.25
	Minimum, Maximum	Range
	0.5, 117	116.5

^(a) SANE = sexual assault nurse examiner

^(b) IQR = interquartile range

^(c) ED = emergency department

Time to Presentation After Sexual Assault, Females presenting to Massachusetts Emergency Rooms, SANE(a) Forensic Encounter Form, 7/03-6/05 (N=392)

Table 2

Variable	Number	Total Person-Hours	aHR (b)	95% CI (c)
White, Non-Hispanic	267	6071	1.20	0.95
Nonwhite	125	3147	Ref.	1.53
Age 12-17	110	2744	0.92	0.72
Adult	277	6291	Ref.	1.18
Known Assailant	215	5552	0.71	0.57
Unknown Assailant	133	2460	Ref.	0.88(d)
Severe Violence	181	3786	1.12	0.88
No Severe Violence	211	5432	Ref.	1.41
Verbal Threat	115	2251	1.29	1.00
No Verbal Threat	277	6967	Ref.	1.65(d)
Intoxicant Exposure	67	1708	0.83	0.60
No Intoxicant Exposure	325	7510	Ref.	1.14

(a) SANE = sexual assault nurse examiner

(b) aHR = adjusted hazard ratio. An adjusted hazard ratio of less than one indicates a delay to presentation for care compared to the reference group, whereas an adjusted hazard ratio of greater than one indicates earlier presentation to care compared to the reference group.

(c) CI=confidence interval

(d) p<0.05