The Social–Environmental Context of Violent Behavior in Persons Treated for Severe Mental Illness

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Recent studies bearing on the relationship between psychiatric disorder and violent behavior suggest that although risk of violence is elevated somewhat in persons with severe mental illness (SMI),[1–4] the large majority of these persons do not commit violent acts,[5] and the causal determinants of violent behavior in this group are perhaps as varied and complex as those in the general population.[6–10] Psychopathology per se seldom leads to assaultiveness, but it may converge with other risk factors that, together, significantly increase the likelihood of violent behavior.[11,12]

Numerous surveys of psychiatric inpatients, outpatients, homeless and mentally ill persons, and emergency room patients have found that a large proportion of persons in treatment for mental health problems have at some time been victims of violent physical or sexual abuse.[13–20] The long-term psychological effects of victimization and trauma exposure may be compounded by substance abuse, homelessness, adverse social environments, and treatment noncompliance—with the net result that risk of violence is markedly increased in certain subgroups of persons with SMI.[21–28] To what degree does each of these kinds of variables contribute—independently or in convergence—to violent actions by persons with mental illness? We examined this question using a multivariate analysis of pooled samples of treated individuals with SMI in 4 states N=802).

METHODS

Study Design and Sample Characteristics

The data for this study were collected as part of a larger investigation of sexually transmitted disease and risk behaviors in people with SMI.[29] Participants were adults with psychotic or major mood disorders who were receiving treatment through the public mental

Objectives. This study examined the prevalence and correlates of violent behavior by individuals with severe mental illness.

Methods. Participants (N=802) were adults with psychotic or major mood disorders receiving inpatient or outpatient services in public mental health systems in 4 states.

Results. The 1-year prevalence of serious assaultive behavior was 13%. Three variables—past violent victimization, violence in the surrounding environment, and substance abuse—showed a cumulative association with risk of violent behavior.

Conclusions. Violence among individuals with severe mental illness is related to multiple variables with compounded effects over the life span. Interventions to reduce the risk of violence need to be targeted to specific subgroups with different clusters of problems related to violent behavior. (*Am J Public Health.* 2002;92:1523-1531)

health systems of Connecticut, Maryland, New Hampshire, or North Carolina, or the Durham Veterans Affairs Medical Center in North Carolina.

In New Hampshire, a sample of inpatients (n=133) was enrolled from consecutive admissions to the state psychiatric hospital; outpatient subjects (n=145) were selected randomly from a list of eligible clients in community support programs at 2 community mental health centers. The Maryland sample (n=135) was randomly selected from a list of clients with schizophrenia or schizoaffective disorder receiving services from 2 community mental health centers in Baltimore. Participants from Connecticut (n=157) were recruited from an ongoing study of community treatment for patients with SMI and substance use disorders in 2 urban mental health centers. North Carolina participants (n=192) had been involuntarily hospitalized and recruited for a study of involuntary outpatient commitment in 9 contiguous rural and urban counties. An additional North Carolina veterans sample (n=184) was enrolled from consecutive admissions to the psychiatric inpatient unit of the Durham Veterans Affairs Medical Center. Across sites, an average of 13% (range= 9%–28%) of those approached declined to participate in the study, mainly because they

were unwilling to answer detailed questions about sexual behavior.

A combined total of 802 subjects provided complete data on violent behavior, victimization, and the demographic and clinical variables needed for the present analysis. Participants had a mean age of 41.9 years (SD= 9.9). The majority (65.1%) were male. About half (51.1%) had never been married, 13.8% were currently married or cohabiting, and 35.1% were divorced, widowed, or separated. The racial/ethnic composition of the sample was 46.8% White, 44.8% African American, 3.3% Hispanic, and 5.3% other race/ethnicity. About one third (33.0%) had less than a high school education, while 29.8% had completed high school and 37.2% had attended 1 or more years of college. Only 18.1% were currently employed. Major psychiatric diagnoses included schizophrenia (44.8%), schizoaffective disorder (19.5%), bipolar disorder (16.9%), major depression (11.3%), and other serious disorders (7.0%). Additionally, 45.4% had comorbid substance use disorders.

Measures

Violence. In this study, violent behavior in the previous year was defined as any physical fighting or assaultive actions causing bodily injury to another person, any use of a lethal

weapon to harm or threaten someone, or any sexual assault during that period. Information was obtained about specific violent behaviors using an instrument developed in a Duke University study of the effectiveness of involuntary outpatient commitment.[30,31] That instrument, in turn, was adapted from the National Institute of Mental Health (NIMH) Diagnostic Interview Schedule's assessment of antisocial personality disorder[32] and the Conflict Tactics Scale.[33] These items yielded an index of violence comparable to that used in the MacArthur Violence Risk Assessment Study.[11]

Victimization. Respondents were asked detailed questions about any experiences of physical or sexual abuse occurring before and after age 16. Physical abuse was defined as being the victim of any assaultive acts as measured in the revised Conflict Tactics Scale.[33] Sexual abuse was defined as any forced or unwanted sexual contact and measured with the Sexual Abuse Exposure Questionnaire.[34]

Demographic and social–environmental variables. Background characteristics included age, sex, race, marital status, income, and homelessness in the past year. Subjects' degree of exposure to violence in their surrounding social environment was measured with the Exposure to Community Violence Scale. This instrument was adapted from a questionnaire used in the NIMH Community Violence Project to assess the impact of witnessing violent events (e.g., muggings, beatings, physical fights, hearing gunfire) on young persons growing up in impoverished inner-city neighborhoods.[35] A 50-item screening version of this instrument showed excellent reliability and internal consistency (Cronbach $\alpha = .92$).[36]

Clinical and institutional variables. Psychiatric diagnosis was obtained from chart review and available clinical data. Posttraumatic stress disorder (PTSD) was assessed separately with the PTSD Checklist–Civilian Version, which provides symptom information that can be used to derive a diagnosis of PTSD consistent with *Diagnostic and Statistical Manual of Mental Disorders,* Fourth Edition, criteria.[37] Observed psychiatric symptomatology was assessed with the Brief Psychiatric Rating Scale.[38] Self-rated mental health status (i.e., the subject's own percep-

tion of his or her mental health overall) was assessed by a single item rated on a 4-point scale. Substance abuse was assessed with the Dartmouth Assessment of Lifestyle Instrument, specifically designed to identify substance use disorders in subjects with SMI.[39] Functional impairment was measured with the Global Assessment Scale, a standard 100-point scale that rates the severity of psychiatric disturbances that affect performance in a range of areas.[40] Medication noncompliance was measured by asking respondents whether they had been prescribed psychiatric medications, and whether they were taking these medications only sometimes or at all. Institutional variables assessed included psychiatric hospitalizations, age at first admission, and arrests.

Analysis

We used logistic regression to examine the relative effects on risk of violent behavior associated with victimization, demographic/social environmental variables, and clinical/institutional variables. We tested the interaction effect of sexual with physical abuse history on later perpetration of violence by examining odds ratios for sexual abuse alone, physical abuse alone, and the combination of both. The same approach was used to test the interaction of early-life (before age 16) and later-life (after age 16) victimization on violent behavior.

Odds ratios from logistic regression estimate the average change in the odds of a predicted event (e.g., violent behavior in the last year) associated with exposure to a risk factor or protective factor. For independent variables measured on a continuous scale, the odds ratio indicates the change in event likelihood per unit change in the predictor.[41,42]

This study required a large, pooled sample to allow multivariate analysis of factors associated with rare events. Pooling the 5-site data posed a problem for statistical inference, given that the samples were not randomly selected from a common population of persons with SMI. To compensate for potential bias, each of the 5 samples was weighted to match distributions of age and the prevalence of substance abuse derived from the NIMH National Comorbidity Study,[43] which provided a nationally representative probability sample

of subjects with psychotic or major mood disorders who reported being hospitalized, using specialty mental health services within the past 6 months, or both. Thus, before the data were pooled, each of the 5 sites was individually weighted to the National Comorbidity Study subsample of treated SMI individuals.

To control for clustering by site and for variance heterogeneity, we estimated logistic regression models using robust variance adjustments applying a cluster function.[44,45] Thus, all statistical significance tests presented in the analyses to follow are based on weighted data controlled for site effects.

RESULTS

The 1-year prevalence of violence in the entire sample was 12.6% (13.6% weighted). Table 1 displays bivariate associations between violent behavior in the past year and current sociodemographic characteristics, clinical characteristics, and history of victimization. The prevalence of violence among subjects with and without each risk factor is presented for the unweighted and weighted samples.

Variables found to be associated with violent behavior in the previous year included homelessness, experiencing or witnessing violence in the surrounding environment, substance abuse, mood disorder, PTSD, lower severity ratings on the Brief Psychiatric Rating Scale, poor subjective mental health status, earlier age at onset of psychiatric illness, and psychiatric hospital admission. Physical abuse occurring before age 16 significantly increased the risk of violence; however, victimization occurring after age 16 was even more strongly associated with violent behavior.

By a separate logistic regression analysis (not shown), we examined type of victimization—sexual vs physical abuse—and found that sexual victimization was not independently related to violent behavior when physical abuse history was controlled. On the basis of that analysis, which controlled for gender, we selected physical abuse history as the operational measure of violent victimization for the remaining multivariate analysis. (It is important to note, however, that physical and sexual victimization were strongly associated with each other in these data.)

TABLE 1—Characteristics of Subjects Treated for Severe Mental Illness and Bivariate Associations With Violence, Unweighted and Weighted

Variable	Unweighted		Weighted		Unadjusted Odds Ratio	95% Confidence Interval
	n	% Violent	n	% Violent		
Age						
Under median age (41 y)	381	15.22	546.8	13.71	1.41	0.79, 2.51
Over median age	421	12.11	255.1	10.14		
Sex						
Female	280	11.07	276.8	11.92	1.10	0.79, 1.52
Male	522	14.94	525.1	12.92		
Race/ethnicity						
African American	428	14.49	429.6	15.21	0.59	0.32, 1.08
White, other	374	12.57	372.2	9.53		
Marital status						
Single	692	13.44	688.6	11.91	1.47	0.52, 4.15
Married or cohabiting	110	14.55	113.3	16.61		
Education						
Less than high school	265	12.83	237.5	11.81	1.06	0.55, 2.02
High school only	239	13.39	259.2	12.75		
More than high school	298	14.43	305.2	13.02		
Income quartile						
1	165	17.58	185.5	17.05	0.93	0.80, 1.08
2	207	11.11	217.2	10.61		
3	210	11.43	173.7	8.07		
4	220	15.00	225.5	4.01		
Employed						
No	657	13.09	634.9	12.66	0.96	0.58, 1.61
Yes	145	15.86	167	12.26		
Homeless in past year						
No	671	10.43	664.5	8.58	5.00†	2.10, 11.88
Yes	131	29.77	137.3	31.92		
Violence in current environment						
No	271	2.95	266.9	2.64	7.82†	2.90, 21.13
Yes	531	19.02	535	17.53		
Substance abuse						
No	438	5.94	543	6.37	5.06†	2.83, 9.06
Yes	364	22.80	258.8	25.60		
Psychiatric diagnosis						
Schizophrenia or other psychotic disorder	514	9.92	505.5	8.30	2.74*	1.14, 6.58
Mood disorder	288	20.14	296.4	19.86		
Posttraumatic stress disorder						
No	461	8.46	468.3	7.29	3.18**	1.38, 7.32
Yes	341	20.53	333.6	20.00		
Functioning						
Global Assessment Scale below median	411	14.60	400.9	11.46	1.22	0.74, 2.02
Global Assessment Scale above median	391	12.53	400.9	13.69		
Psychiatric symptoms						
Brief Psychiatric Rating Scale below median	442	16.06	436.1	14.36	0.70**	0.55, 0.87
Brief Psychiatric Rating Scale above median	360	10.56	365.7	10.45		

Continued

TABLE 1—Continued

Self-rated mental health						
Fair to Excellent	664	11.45	660.5	9.66	3.32†	2.35, 4.68
Poor	138	23.91	141.4	26.20		
Age at onset of illness						
Below median (19 y)	405	17.04	450.3	15.82	0.49*	0.26, 0.91
Above median	397	10.08	351.5	8.42		
Age at first admission						
Below median (23 y)	424	16.27	477.5	12.62	0.99	0.24, 4.01
Above median	378	10.58	324.3	12.51		
Psychiatric admission in past year						
No	385	6.75	359.1	5.96	3.45†	2.35, 5.05
Yes	417	19.90	442.8	17.94		
Arrested in lifetime						
No	231	5.19	255.8	8.85	1.72	0.52, 5.70
Yes	571	16.99	546.1	14.32		
Noncompliance with medications						
No	713	13.18	719.7	11.85	1.74	0.60, 5.06
Yes	89	16.85	82.14	18.97		
Physical abuse before age 16						
No	343	6.71	367.4	5.07	4.37†	2.57, 7.42
Yes	459	18.74	434.5	18.92		
Physical abuse after age 16						
No	157	2.55	178.6	2.25	7.99†	2.87, 22.24
Yes	645	16.28	623.3	15.53		

*P<.05; **P<.01; ***P<.001; †P<.0001 (statistical significance test controlling for cluster sampling).

Table 2 presents multivariate logistic regression models for 3 domains: (1) demographic/social–environmental variables, (2) clinical/institutional variables, and (3) violent victimization. A fourth model examines interaction effects of early-life vs later-life victimization, and a final model selects significant effects from each domain.

Model 1 assesses the relative effects of demographic and social–environmental risk factors. Homelessness (odds ratio [OR]=4.37, P<.04) and degree of exposure to community violence (OR=1.86, P<.0001) were significantly associated with violent behavior. The marital status of being married or cohabiting showed a positive association with violence at a level approaching statistical significance (OR=2.08, P<.10). In this context, a married or cohabiting status may function as a proxy variable for increased opportunity for domestic altercations leading to violence. Homelessness may encompass a number of specific contextual risk factors associated with

violence, such as fighting as a means of survival in dangerous congregate shelters or on the streets in high-crime urban areas. Also, fighting may lead to eviction from housing.

Model 2 examines the effects of clinical and institutional variables, showing that substance abuse (OR=4.32, P<.001), self-rated mental health status of "poor" (OR=2.29, P<.001), age at onset of disorder below the sample median of 19 years (OR=2.37, P<.05), and psychiatric admissions in the past year (OR=2.12, P<.001) all significantly increase risk of violence. History of hospitalization may function as a proxy indicator of relapse of acute psychiatric illness. In the absence of longitudinal data, however, caution must temper interpretation of the causal order of this association; although relapse of illness requiring inpatient care may predict violent behavior, hospital admission may also result from dangerousness.

Model 3 shows the effect on violence of early-life victimization (before age 16; OR=

3.34, P<.001) and later victimization (after age 16; OR=5.24, P<.01). Model 4 shows the main effects of early-life victimization alone (before age 16 only; OR=1.55 [not significant]), later victimization alone (after age 16 only; OR=3.63, P<.05), and the interaction effect of early-life and later victimization combined (OR=12.87, P<.001). This analysis shows that subjects who were victimized as children, but not revictimized as adults, were not significantly more likely to behave violently in comparison with subjects who were never victimized. Subjects who were victimized as adults were significantly more likely to engage in violent behavior even if they were not victimized as children. However, subjects who were victimized both as children and later as adults were by far the most likely to behave violently toward others.

Model 5 contains the significant effects selected from each of the 3 domains. In this final model, victimization among persons with

TABLE 2—Logistic Regression Models of Predictors of Serious Violent Behavior in the Past Year Among Persons With Severe Mental Illness

	Model 1, Odds Ratio (95% CI)	Model 2, Odds Ratio (95% CI)	Model 3, Odds Ratio (95% CI)	Model 4, Odds Ratio (95% CI)	Model 5, Odds Ratio (95% CI)
Demographic and social–environmental variables					
Married/cohabiting vs single	2.08* (0.89, 4.86)				2.47* (1.12, 5.48)
Age < 40 y	1.60 (0.90, 2.83)				
Male vs female	0.95 (0.60, 1.52)				
African American	0.52 (0.23, 1.15)				
Income quartile	1.07 (0.96, 1.20)				
Homelessness	4.37** (1.04, 18.36)				3.35* (1.11, 10.15)
Community violence	1.86† (1.59, 2.17)				1.55† (1.39, 1.73)
Clinical and institutional variables					
Substance abuse		4.32† (2.66, 7.02)			3.10** (1.64, 5.85)
Psychiatric diagnosis: mood vs psychotic disorder		2.02 (1.24, 3.29)			
Posttraumatic stress disorder		1.86 (1.10, 3.15)			
Symptoms: BPRS score above median		1.10 (0.67, 1.80)			
Functioning: GAS score above median		1.35 (0.82, 2.23)			
Poor mental health status		2.29† (1.33, 3.94)			2.06* (1.10, 3.85)
Age at onset below median (< 19 y)		2.37** (1.30, 4.09)			
Age at first admission above median (>23 y)		1.30 (0.75, 2.24)			
Psychiatric admission in past year		2.12† (1.22, 3.69)			1.29** (1.07, 1.56)
Ever arrested		1.22 (0.69, 2.14)			
Medication noncompliance		1.16 (0.59, 2.26)			
Violent victimization (main effects)					
Victimization before age 16			3.34† (2.02, 5.53)		
Victimization after age 16			5.24*** (1.57, 17.45)		
Violent victimization (interaction effects)					
Victimization before age 16 only				1.55 (0.40, 5.94)	1.30 (0.32, 5.38)
Victimization after age 16 only				3.63** (1.23, 10.70)	3.13 (0.80, 12.22)
Victimization before and after age 16				12.87† (6.19, 26.75)	5.91** (1.70, 20.57)
N	802	802	802	802	802
–2 log likelihood	–235.17†	–244.00†	–276.52†	–276.52†	–211.05†
Pseudo R^2	0.22	0.19	0.09	0.09	0.30

Note. CI = confidence interval; BPRS = Brief Psychiatric Rating Scale; GAS = Global Assessment Scale. Estimates are adjusted for clustering on site and are weighted to match age and substance abuse distributions for a comparable subsample in the National Comorbidity Study.
*P < .10; **P < .05; ***P < .01; †P < .001.

SMI is significantly related to violence only if it occurred both before and after age 16 (OR = 5.91, P < .01). Model 5 also shows significant effects for marital status, homelessness, exposure to community violence, substance abuse, poor mental health status, and psychiatric admission.

In additional analyses (not shown), we tested the direct unadjusted effects of sample site on violence. A significant bivariate association with site was found, with unadjusted rates ranging from about 5% in the Maryland sample (community mental health center clients) to about 23% in the Durham Veterans Affairs hospital sample (recruited as inpatients). However, no significant net effects of site remained in weighted multivariate models that controlled for covariates including substance abuse, trauma history, and exposure to community violence.

As noted in Table 1, no significant bivariate association was found between gender and violence in these data; about 15% of male subjects were violent, compared with 11% of female subjects. However, some previous studies[30,46] have suggested that certain features, settings, and causal pathways leading to violence may be different for male vs female individuals with SMI— even if the prevalence of violent behavior is similar across both genders in psychiatric populations.

To consider generally the question of whether risk factor effects on violence may vary by gender, we reestimated our multivariate models separately for male and female subjects. The results of this stratified analysis must be interpreted with caution, because the weighted sample size for the

male subgroup was much larger (n=525) than for the female subgroup (n=277), thus providing greater statistical power to detect significant effects on violence for males.

With that caveat, however, in stratified models there were no differences by gender in the strong association between prolonged exposure to violent victimization (before and after age 16) and increased risk of later violent behavior—although the effect was stronger among males (OR=18.7, $P<.001$) than among females (OR=7.6; $P<.05$). (There was insufficient statistical power to examine violence associated with specific types of victimization by gender and life period.)

In male subjects, the association between sustained violent victimization and later perpetration of violence remained significant (OR=9.25, $P<.05$) after control for additional significant risk factors, including cohabitation (i.e., a proxy for spouse/partner abuse opportunity; adjusted OR=5.5, $P<.001$), homelessness (adjusted OR=3.2, $P<.01$), exposure to community violence (adjusted OR=8.5; $P<.01$), and substance abuse (adjusted OR=6.4, $P<.001$).

In contrast, among female subjects, the effect of history of victimization on violent behavior was apparently mediated by 2 intervening indicators of adult psychopathology: current mental health status rated as "poor" (adjusted OR=2.8, $P<.05$) and number of lifetime psychiatric hospitalizations (adjusted OR=1.5, $P<.01$). The effect of victimization on violent behavior in women was also mediated by 1 indicator of exposure to adverse environments—recent homelessness (adjusted OR=9.1, $P<.01$). In a stratified multivariate model controlling for these covariates (i.e., in female subjects only), the association between recent violence and history of victimization before and after age 16 was rendered nonsignificant.

Figure 1 displays the predicted probabilities of violent behavior derived from the final logistic regression model (from Table 2) in subjects with all combinations of 3 salient risk factors, 1 selected from each domain in the model: exposure to violence in the current environment, substance abuse, and lifetime victimization. These 3 variables were chosen because they showed the strongest associations with violence in each domain.

These findings illustrate that whereas current social environment, substance abuse comorbidity, and past trauma exposure each play an important role, it is the combination of all 3 of these elements that results in the most substantial increase in the likelihood of assaultive actions by adults with SMI.

DISCUSSION

Focusing on the empirical relationship between violence and mental disorder can, unfortunately, reinforce the stigma that persons with psychiatric disabilities continue to face in the community.[47–49] However, the likelihood that some individuals with SMI may commit assaultive acts is a significant risk to be addressed by providers and caregivers. More informed and nuanced models are needed to elucidate how and why violent behavior occurs in individuals with mental illness who have certain characteristics and experiences.[50]

In a large and diverse sample of adults with SMI, we found that about 13% by their own report had committed assaultive acts during the previous year. In relative terms, this prevalence rate is substantially higher than estimates of the violence rate for the general population, while it still supports the conclusion of other epidemiological studies that the large majority of persons with SMI do not commit violent acts.[5]

This study examined an extensive range of epidemiological risk factors and found that violence was independently associated with history of violent victimization, homelessness, cohabitation, exposure to community violence, substance abuse, poor self-rated mental health status, and history of psychiatric hospital admission. No single variable stood out as "the primary explanation" for violence in this large sample.

The effects of victimization on violence were found to be highly significant if subjects had experienced repeated physical abuse throughout their lives. Persons who had been victimized only during early life, but not after age 16, were no more likely to commit violent acts than were persons who had never been victimized. However, the risk of violence was several times higher in those who were victimized both before and after age 16, compared with those victimized during only 1 period. Thus, repeated abuse has a cumulative association with violence.

Like experience of victimization, substance abuse and exposure to community violence were each found to be strongly associated with violent behavior. Alcohol and illicit drug use can lead to violence by disinhibiting aggressive behavioral impulses, creating conflict
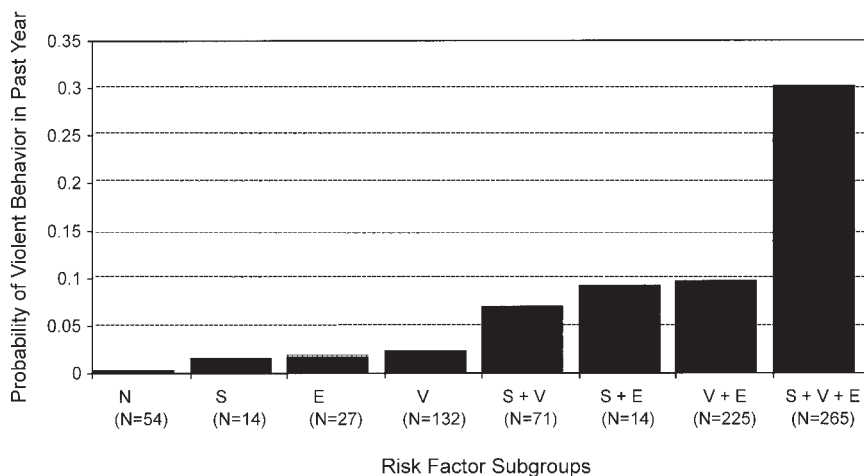
Note. Risk factors are as follows: N = none; S = substance abuse; V = violent victimization history; E = exposure to violence in current environment.

FIGURE 1—Predicted probability of serious violent behavior in persons with serious mental illness by combined risk factors, controlling for significant covariates in a logistic regression model (n = 802).

in social relationships, and exposing the substance user to violent environments. Moreover, people who routinely witness or experience violent events in their surrounding communities over a long period of time may begin to act violently themselves, as a learned behavior or reaction to perceived threat from others.

These risk factors do not operate in isolation. The analysis depicted in Figure 1 indicates that subjects with none, or only 1, of these factors had predicted probabilities of violence of 2% or below—which is close to the National Institute of Mental Health Epidemiologic Catchment Area Study estimates of the 1-year prevalence of violence in the general population without mental illness.[1] However, adding a second risk factor doubled (at least) the probability of violence, and respondents with all 3 risk factors combined were by far the most likely to commit violent acts—with a predicted probability of 30%. These analyses support the view that violence by persons with SMI is the result of multiple variables with compounded direct and indirect effects over the life span.

We also found some evidence suggesting that the patterns and etiologies of violence may vary for males with SMI compared with females with SMI. Although the prevalence of violence did not differ significantly by gender, and victimization history was associated bivariately with violence among male and female subjects alike, the effect of victimization in women was apparently mediated by mental health problems and homelessness, whereas in men the effect of violent victimization remained independently associated with violent behavior after adjustment for other significant risk factors (i.e., cohabitation, homelessness, exposure to community violence, and substance abuse).

This study is limited in several ways. The overall effect of mental disorder cannot be examined with these data, since treatment for SMI was a requirement for study participation, and no comparison group without treated mental illness was included. The selection of a sample with SMI probably also attenuated the effects of certain demographic variables (e.g., male gender, known to increase risk of violence in the general population).[5] Despite use of sample weighting and robust variance estimation techniques to improve generalizability, it is difficult to define with precision the population with treated major mental disorders to which our results should generalize.

Because the data were gathered in a cross-sectional survey, causal ordering cannot be established, and causality thus should not be strongly inferred from our regression results. It is particularly difficult to interpret the association between recent victimization and violent behavior. Violence-prone individuals are likely both to perpetrate and to become victims of violent acts, given that their aggressive behavior may expose them to dangerous situations and physical confrontation.

The survey relied only on self-report to obtain sensitive personal information about committing violent acts and about victimization. The validity and reliability of self-report measures of victimization and trauma exposure have been demonstrated in previous studies of comparable populations.[51] Moreover, previous large-scale epidemiological studies have illuminated the relationship between violence and mental illness using only self-report measures.[1,2] However, recent studies using composite indices of violence with multiple informants and record reviews[3,6,30,31] have found higher rates of violence in psychiatric populations than those found in the present study, thus suggesting that our findings are probably conservative estimates of the true prevalence of violent behavior in persons with SMI. We found no evidence to suggest that the underreporting of violent acts was systematically related to any covariate in a way that would bias our findings on factors associated with violence. However, the possibility still exists that nonrandom underreporting created a bias in our multivariate analysis.[52]

A final limitation is that we did not examine variations in mental health treatment receipt, type, or intensity. It is thus impossible to conclude, from our data, whether mental health interventions or contact with service providers might lower the risk of violence in these subjects.

These limitations notwithstanding, the findings presented here may be useful in bringing home the message that risk of violence among persons with SMI is a significant problem that must be considered in a broad context, with a particular emphasis on social–environmental factors. Individuals with SMI who should raise the most concern are those with combined risk factors in several domains—past traumatic experiences, current clinical problems including substance abuse comorbidity, and continuing exposure to adverse social environments characterized by everyday violence.

Effective interventions to reduce risk of violence among persons with SMI must be comprehensive yet specifically targeted—addressing underlying major psychiatric disorder but also addiction, trauma sequelae, domestic violence, and need for housing, income, and community support. Our findings suggest that there may be several specific subgroups within the population of individuals with SMI who are at increased risk for violent behavior. For example, 1 subgroup may be suffering primarily from the long-term complications of violent victimization, which may have begun in early life and is recurrent in adulthood. Addressing violent behavior in this group may require a specific clinical focus on posttraumatic stress problems. Another subgroup may consist of individuals in conflict-laden domestic relationships that may require relationship counseling, conflict resolution, anger management, or domestic violence interventions. A third subgroup may comprise of persons who are frequently homeless. Appropriate interventions in this group could focus on achieving stable housing in conjunction with delivery of mental health services.

Interventions may need to include treatment for alcohol addiction or substance abuse combined with appropriate medical management of a primarily psychiatric illness that addresses the additional complication that substance abuse often poses for treatment adherence. A legal approach such as assisted outpatient treatment (or involuntary outpatient commitment) may be warranted in addressing treatment nonadherence.[31]

All of these approaches require significant resources, both in terms of identification and assessment of the problem and in terms of delivery of specific services. However, better-focused and -targeted interventions that assess and anticipate risk of violence could reap very worthwhile benefits, given the dimen-

sions and cost of the problem of community violence in persons with SMI and, perhaps more to the point, its tragic consequences in many lives and in society in general if not prevented. ∎

About the Authors

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J. W. Swanson was primarily responsible for planning and conducting the data analysis, interpreting the results, and drafting the article. M.S. Swartz, S.M. Essock, F.C. Osher, L.A. Goodman, S.D. Rosenberg, and K.G. Meador each contributed significantly to conception and design of the multisite study, development of the core measures and instrumentation, supervision of data collection at their respective sites, interpretation of the findings, and revision of the article. H.R. Wagner contributed to the statistical analysis and interpretation.

Human Participant Protection

All subjects enrolled in this study gave informed consent to participate in the research. Procedures were approved by the institutional review board at each participating university and treatment facility.

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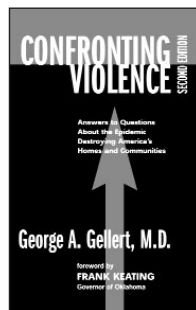48. Pescosolido B, Monahan J, Link B, Stueve A, Kikuzawa S. The public's view of the competence, dangerousness, and need for legal coercion of persons with mental health problems. *Am J Public Health.* 1999;89: 1339–1345.

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