History of violent behaviour and schizophrenia in different cultures

Analyses based on the WHO study on Determinants of Outcome of Severe Mental Disorders

JAN VOLAVKA, EUGENE LASKA, SHERRYL BAKER, MORRIS MEISNER, PAL CZOBOR and ILYA KRIVELEVICH

Background Information on patterns and correlates of the violent behaviour of individuals with schizophrenia is largely limited to populations in developed countries. Data from a World Health Organization epidemiological study of schizophrenia and related disorders, the Determinants of Outcome of Severe Mental Disorders (DOSMD), presented an opportunity to study patterns of violence across multinational settings.

Method Centres in 10 countries participated in the DOSMD study. An incidence sample of 1017 patients with schizophrenia who had their first-in-lifetime contact with a helping agency as a result of their psychotic symptoms was obtained. Data were available on their history of violent behaviour, substance use, and demographics.

Results The occurrence rate of assault in the entire cohort was 20.6 per hundred, but the rate was three times higher in the developing countries (31.5 per hundred) than in the developed countries (10.5 per hundred). History of assault was associated with positive symptoms, such as excitement and auditory hallucinations, and with serious alcohol problems.

Conclusions The cultural context and the specific characteristics of the disease in individuals with schizophrenia may interactively affect rates of violent behaviour.

Most persons diagnosed with schizophrenia are not violent. However, it has been observed in Western cultures that such individuals are more likely to behave violently than persons without a mental disorder (Swanson, 1994; Volavka, 1995). The hypothesis that schizophrenia may be causally related to an increased chance of violence is supported by the finding of a temporal link between the two phenomena (Taylor, 1985). Additionally, individuals with schizophrenia may be at elevated risk for comorbid alcohol and other substance misuse disorders (Regier *et al*, 1990), and these are robustly related to violent behaviour.

The evidence for an association between schizophrenia and violence is based almost exclusively on studies conducted in developed countries (Volavka, 1995). We examined some aspects of these relationships in a cross-cultural context by re-analysing the data from a large World Health Organization (WHO) coordinated international two-year follow-up study of schizophrenia in which, rather fortuitously, some information on violence was acquired. (The investigators of the study concluded that the outcome of schizophrenia in developing countries is more favourable than in developed countries (Jablensky *et al*, 1992)). We were specifically interested in exploring whether, at the onset of their illness, individuals with schizophrenia in developed and developing countries differ in their rates of history of assaultive behaviour, as well as in determining the items which are correlated with this behaviour.

METHOD

The Determinants of Outcome Study

In 1978, the Determinants of Outcome of Severe Mental Disorders (DOSMD) study (Sartorius *et al*, 1986; Jablensky *et al*, 1992) was initiated by the WHO. The main purpose of the research was to study the frequency of occurrence, natural history, course, and two-year outcome of schizophrenia in an incident sample in different cultures around the world. Data were collected in seven developed countries (Czechoslovakia, Denmark, Ireland, Japan, the UK, the USA and the USSR) and three developing countries (Colombia, India and Nigeria). In eight of the participating countries there was a single field research centre that contributed patients; the USA had two field research centres, and India had three. Thus, there were 13 field research centres, five of which were located in developing countries.

Patients

At study entry, patients were between 15 and 54 years of age, had resided in the catchment area for at least six months during the year preceding the initial examination, had evidence of psychotic symptoms (Jablensky *et al*, 1992) in the preceding 12 months, and had their first-in-lifetime contact, occasioned by these symptoms, with a "helping agency" within the preceding three months. Data were collected on a cohort of 1379 patients using a set of standardised instruments at baseline and at follow-up two years later. Among these patients, 1151 were diagnosed with schizophrenia according to ICD–9 criteria (World Health Organization, 1978). There was no information on assault available on 134 of the cases. The sample size of the data-set we analysed, therefore, was 1017, of whom 570 were males and 447 females.

Variables

The analyses reported here are based entirely on data obtained during the initial patient interviews that were recorded on the Psychiatric and Personal History Schedule (PPHS), an instrument constructed specifically for this study and described elsewhere (Jablensky *et al*, 1992). Briefly, the PPHS is a standardised guide to data collection, using multiple sources of information on the history of illness, life events, premorbid personality, and the emerging psychopathology of a patient. The sources of information for most patients included a relative or other key informant, the patient, and clinic or hospital records. About a third of the cases had no data from outside informants. The information for these cases came from the patient or from case notes.

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Measures of violence

DOSMD was not designed to study violence, and so only a limited amount of relevant information is available. The most appropriate variable for ascertaining whether an individual committed a violent act was an informant's answer to the question in the PPHS interview: "Did [the patient] at any time in the past assault another person physically?" The three possible answers were: "yes", "no" or "uncertain". If the answer was yes, the patient was said to have a history of assault. Also, information was available on the number of months prior to the interview that the assault occurred and on the temporal relationship (preceding, coincided or subsequent) to the first signs (i.e. the onset) of mental illness.

Clinical variables

Based on questions in the PPHS analogous to those enquiring about assault, the informants were asked about the following behaviours that may be related to psychotic symptoms in the patient's past:

(a) manic excitement ("Did the patient become very excited for days or weeks, trying to do too many things at once?");

(b) spending sprees ("Did the patient spend money in a wild and irresponsible fashion, quite unlike his/her former self?");

(c) hearing voices ("Did the patient behave on more than one occasion as if hearing voices?");

(d) paranoid ideation ("Did the patient say that (s)he was persecuted, harmed, or bewitched by other people?"); and

(e) suicidal ideation ("Did the patient attempt to kill or harm herself/himself?").

Also, information about the mode of onset of the patient's disorder was obtained. The onset was classified by the interviewers into several categories ranging from acute to insidious (Jablensky *et al*, 1992). Finally, reports on patients' drug and alcohol use in the year before the onset of the illness were obtained from the informants.

Demographic variables

The demographic variables describing the patients included: type of community (rural, peri-urban, urban) in which the patient resided, age, gender, educational level, and socio-economic status. The latter was characterised by an indicator of the economic position of the patient's current neighbourhood in relation to the catchment area as a whole.

Consistency variables

There was no information that could be used directly to corroborate the veracity of the data collected on the assault variable. However, there was information obtained from the same informant which could be used to check the internal consistency of the responses. These variables were:

(a) an assault or other violent or hazardous act was the reason for current admission;

(b) the patient caused damage to property;

(c) the patient was arrested;

(d) the patient was detained;

(e) the patient was placed on probation.

On the basis of these responses, we defined a new indicator variable. If a subject had one or more of the five events listed above, he or she was said to have a history compatible with assault.

Background rates of violent crime

Interpretation of the differences in rates of assaultive behaviour of patients can be problematic without information about the base rates of violent behaviour of the general population in different countries. Limited data on violent crime rates were available for nine of the 10 participating countries (Archer & Gartner, 1984; Maresova, 1993). We were unable to locate comparable data on crime rates for the USSR. For each of the nine countries, an annual rate (per 100 000 inhabitants) of murder and of robbery was obtained. The years for which the rates were available varied between 1967 and 1978.

Country classification

An indicator variable was created to characterise whether the country in which a field centre was located was developed or developing. This classification of countries (see above) was determined by the United Nations and was used by Jablensky *et al* (1992).

Statistical methods

Chi-squared statistics were used to test for association between a history of assaultive behaviour and demographic, clinical, and other variables. Logistic regression analyses were used to examine whether the probability of assaultive behaviour (the dependent variable) was affected by various other (independent) variables. In these analyses, Wald chi-squared statistics were used to test whether the coefficients of the independent variables differed from zero. Log-linear models were used to test whether there were relationships between assaultiveness on one hand, and manic excitement, spending sprees, and hearing voices on the other. Interaction variables were defined to determine whether the country classification variable affected these relationships. The relative risk of having a history of assault for various risk factors was estimated by the odds ratio (OR); 95% confidence intervals (CIs) for these estimates were computed using standard methods (Hillis & Woolson, 1995).

RESULTS

Consistency variables

A significant association was found between the history of assault variable and each of the five consistency check variables (chi-squared test for each variable: d.f.=1, $P<0.05$). The highly significant association between the compatible history indicator variable and the history of assault variable is shown in Table 1. During the research interviews, some patients displayed behaviour described as "hostile irritability", which was noted in 115 out of 930 cases with available data (Table 1); this behaviour was significantly associated with the history of assault variable. Thus, there is considerable evidence that the information on assault in the data-set is internally consistent.

Comparison between developed and developing countries

Among the 1017 patients with available data, 209 (20.6%) had a history of assault, which was more frequent in the developing (31.5%) than in the developed countries (10.5%) (Table 1). The relative risk for having a history of assault in a developing country versus a developed country was 3 (95% CI 2.26–3.95).

Clinical correlates of a history of assault

Timing of assault

The information on the timing of assaults was available in a subset (n=194) of the 209 patients who had a positive history of assault. In these 194 patients, 13 assaults preceded the onset of the illness, 112 coincided with the onset, and 69 occurred after the onset.

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Table 1 Correlates of history of assault

Independent variables	History of assault			Relative risk (95% CI)	χ^2	d.f.	P
	Absent	Present	Total				
Country classification					68.12	1	0.001
Developed	475 (89.5%)	56 (10.5%)	531				
Developing	333 (68.5%)	153 (31.5%)	486	2.99 (2.26–3.95)			
History compatible with assault					298.00	1	0.001
Absent	647 (94.3%)	39 (5.7%)	686				
Present	141 (46.4%)	163 (53.6%)	304	9.43 (6.83–13.02)			
Hostile irritability					22.77	1	0.001
Absent	672 (82.5%)	143 (17.5%)	815				
Present	73 (63.5%)	42 (36.5%)	115	2.08 (1.57–2.76)			
Excitement					47.29	1	0.001
Absent	654 (84.2%)	123 (15.8%)	777				
Present	135 (62.8%)	80 (37.2%)	215	2.35 (1.85–2.98)			
Auditory hallucinations					7.86	1	0.005
Absent	399 (83.5%)	79 (16.5%)	478				
Present	365 (76.2%)	114 (23.8%)	479	1.44 (1.11–1.86)			

Psychotic symptoms

There were statistically significant univariate associations between a history of assault and manic excitement, spending sprees and hearing voices. (The chi-squared statistics for manic excitement and auditory hallucinations are given in Table 1; χ^2 for spending sprees was 17.7: d.f.=1, $P<0.001$.) The associations between a history of assault and paranoid ideation, and between a history of assault and suicidal ideation, were not statistically significant.

Log-linear models were used to test whether the relationships between a history of assault and manic excitement, spending sprees, and hearing voices depended on the country classification. For each of these three variables, the association with assault remained statistically significant when country classification was included in the model. Also, country classification was significantly associated with a history of assault. The interaction between country classification and psychiatric symptoms was not significant in any of these three analyses. This suggests that the relationship between country classification and a history of assault is not mediated by psychiatric symptoms.

Mode of onset

The association between mode of onset and a history of assault was marginally significant ($\chi^2=9.42$; d.f.=4, $P=0.051$). A history of assault was more likely in patients with acute onset than in those whose onset was more insidious.

Drug use in the past year

The percentage of patients who used drugs in the previous year was 15.3%. The drugs most frequently reported were cannabis preparations (marijuana or hashish) (11.4%). The other drugs about which information was specifically sought (morphine, opium, amphetamine, LSD, cocaine, barbiturate and non-barbiturate drugs) were each reportedly used by less than 2% of the cases. There was a statistically significant association between drug use and a history of assault in the developing, but not in the developed, countries (Table 2).

Alcohol use in the past year

Among the 1002 patients with data on alcohol use in the previous year, 572 were abstainers, 295 drank occasionally, 96 drank moderately, and a serious alcohol problem was suspected (or demonstrated) in 39 of the patients (Table 3). There was a significant increase in the risk of a history of assault for patients with serious alcohol problems relative to those with less severe or no problem. Occasional use appeared to be protective, in that the relative risk compared with non-drinkers was 0.64 (95% CI 0.47–0.88).

Table 2 History of assault and drug use in developed and developing countries

Drug use in past year	History of assault			Relative risk (95% CI)	χ^2	d.f.	P
	Absent	Present	Total				
Developing countries					28.70	1	0.001
Definitely no	277 (73.7%)	99 (26.3%)	376				
Suspected or yes	30 (41.7%)	42 (58.3%)	72	2.22 (1.71–2.87)			
Developed countries					0.71	1	NS
Definitely no	398 (90.0%)	44 (10.0%)	442				
Suspected or yes	66 (86.8%)	10 (13.2%)	76	1.32 (0.70–2.51)			

Table 3 History of assault and alcohol use

Alcohol use in past year	History of assault			Relative risk (95% CI[1])
	Absent	Present	Total	
None	445 (77.8%)	127 (22.2%)	572	
Occasional	253 (85.8%)	42 (14.2%)	295	0.64 (0.47–0.88)
Moderate	77 (80.2%)	19 (19.8%)	96	1.02 (0.66–1.55)
Serious problem	25 (64.1%)	14 (35.9%)	39	1.84 (1.19–2.85)

1. Relative risk of assault associated with increasing severity of alcohol use (occasional use *v.* no use; moderate *v.* less severe; serious *v.* less severe).
$\chi^2=13.92$, d.f.=3, $P=0.003$.

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Table 4 Demographic correlates of history of assault

Independent variables	History of assault			Relative risk (95% CI[1])	χ^2	d.f.	P
	Absent	Present	Total				
Educational level					14.11	1	0.001
Finished at least primary school	708 (81.4%)	162 (18.6%)	870				
Did not enter or finish primary school	88 (67.2%)	43 (32.8%)	131	1.76 (1.33–2.34)			
Socio-economic level					25.43	2	0.001
High	51 (89.5%)	6 (10.5%)	57				
Medium	542 (82.9%)	112 (17.1%)	654	1.63 (0.75–3.53)			
Low	207 (69.7%)	90 (30.3%)	297	1.83 (1.44–2.32)			

1. For socio-economic level, relative risk of assault associated with decreasing level of socio-economic status (medium *v.* high; low *v.* medium and high).

A logistic regression, using history of assault as the dependent variable, was used to explore the effects of alcohol use and country classification. The independent variables were alcohol use, country classification, and their interaction. The interaction effect was not significant. Increased alcohol use was significantly associated with increased probability of a history of assault (Wald $\chi^2=6.55$, d.f.=1, $P=0.01$; OR 1.48, 95% CI 1.09–2.00). Also, consistent with earlier analyses, country classification was associated with an increased risk of a history of assault; (Wald $\chi^2=21.42$, d.f.=1, $P<0.001$; OR 6.75, 95% CI 3.05–15.41).

Demographic and general population measures of violence, and their effect on correlates of history of assault

The percentage of patients with a history of assault among males was 22.6%, and among females was 17.9%, and these are not statistically different. The average age (s.d.) of patients with a history of assault, 24.9 (7.92) years, was significantly less than the average age of those without a history of assault (27.0 (9.20) years, $t=2.96$, d.f.=1015, $P<0.003$).

Low educational attainment (no education or unfinished primary school) was significantly associated with a history of assault (Table 4), as was residence in a rural community. However, an analysis based on a log-linear model indicated that the latter relationship was mediated by the development status of the country. Low socio-economic status was significantly associated with a history of assault (Table 4).

Other factors, including patient demographic variables and measures of rates of violent behaviour of the general population in the various countries, might be responsible for the observed statistical difference between the developed and developing countries in rates of history of patient assaultiveness. To examine this possibility, we studied patients ($n=892$) from the nine countries for which there were base crime rates available, using a logistic regression. History of assault was the dependent variable, and country classification, demographic and base crime rates were the independent variables.

The country classification remained highly significant (Wald $\chi^2=20.31$, d.f.=1, $P<0.0001$), with the patients in the developing countries exhibiting a higher probability of a history of assault. The only other independent variable that reached statistical significance was the patient's educational level (Wald $\chi^2=6.02$, d.f.=1, $P<0.01$): a lower educational level was associated with a higher probability of a history of assault. Thus, the difference between the developing and the developed countries in the rate of history of assault remained significant even when demographic and base crime rate variables were included in the model.

DISCUSSION

Demographic and clinical context of history of assault

In an incident sample, a history of assaultive behaviour was more likely to occur in patients living in developing countries, and in those who were younger, with low socio-economic status, and with minimal educational attainment. A history of assault was associated with serious alcohol-related problems, and, in the developing countries, with drug use. The association of these variables with violent behaviour has been repeatedly found in many populations (Volavka, 1995). To our knowledge, the observation of a more frequent history of assault in an incident sample of individuals with schizophrenia in the developing countries compared with developed countries has not previously been reported. We found no evidence in the data to support the hypothesis that these differential rates are the result of confounding factors such as different levels of violent crime in the general population, differences in the distribution of type of psychotic symptoms, or of comorbid substance use.

In a majority of patients (57.7%), the assault coincided with the reported onset of schizophrenic illness, and it may be speculated that, in these cases, it was one of the presenting symptoms. This possibility is supported by the association of assaultive behaviour with reports of manic excitement, auditory hallucinations, and a more acute onset of the illness. The occasion of such events is, of course, the interaction of the patient's behaviour and the manner in which the treatment system responds.

The effect of country classification on the probability that a patient had a history of assault remained statistically significant when the patient's socio-economic status was included in the model. The effect of the latter variable was not significant. However, this should not be taken as proof that poverty plays no role in the elevated rates of history of assault observed in developing countries. The measure of socio-economic status used in DOSMD was based on the economic position of the patient's neighbourhood *relative to his/her catchment area as a whole*. Among individuals living in a neighbourhood, there may be considerable socio-economic variability. Also, this measure does not reflect socio-economic differences among the catchment areas. Clearly, the catchment areas in the developing and developed countries differed considerably in the wealth of their populations. Thus, we can say little about whether socio-economic status contributed to the difference in the rates of history of assaultiveness observed between the developed and the developing countries.

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There are many speculative hypotheses that can be put forward to account for the main findings. For example, it may be that community tolerance for violent patients who display florid symptoms in the developing countries is lower than in the developed countries. Conversely, it may be that less dramatic indicators of an individual's distress are responded to, by lay people and professionals alike, earlier and/or more effectively in developed countries. Furthermore, communities in the developing countries may accommodate or tolerate patients with predominantly negative symptoms to a greater extent than those in the developed countries. If true, either of these mechanisms might lead to an increased probability that violent patients with florid positive symptoms would be referred at higher rates to mental health authorities in the developing countries. In this case, the observed higher rates of patients with a history of assaultiveness in developing countries would be the result of a culturally determined sampling artefact. Another possibility is that some aspects of the cultural context of the developing countries provoke a more violent response to the illness, perhaps because of the difficulties of ordinary life events. There may be genuine differences in the distribution of symptoms and/or their consequences. Unfortunately, the data in the DOSMD study do not permit an assessment of these or the many other possible alternatives.

CLINICAL IMPLICATIONS

- Patients with schizophrenia in the developing countries may be more likely to have a history of assaultive behaviour on first contact with mental health authorities (31.5%) than those in the developed countries (10.5%).
- The assault coincides with the onset of illness in about 58% of the patients with a history of assault.
- Excitement, auditory hallucinations, minimal educational attainment, and history of serious alcohol-related problems are associated with a history of assault.

LIMITATIONS

- "Physical assault" is inadequately defined; the reliability of its assessment is uncertain.
- The data were obtained almost 20 years ago and the diagnosis is given in terms of ICD–9.
- The data were obtained in patients in early stages of schizophrenia, so the results may not generalise to more chronic patients.

JAN VOLAVKA, MD, EUGENE LASKA, PhD, Nathan S. Kline Institute for Psychiatric Research, and New York University Medical Center, New York; SHERYL BAKER, PhD, Nathan S. Kline Institute for Psychiatric Research, New York; MORRIS MEISNER, PhD, PAL CZOBOR, PhD, Nathan S. Kline Institute for Psychiatric Research, and New York University Medical Centre, New York; ILYA KRIVELEVICH, Nathan S. Kline Institute for Psychiatric Research, Orangeburg, New York, USA

Correspondence: Dr J. Volavka, The Nathan S. Kline Institute for Psychiatric Research, 140 Old Orangeburg Road, Orangeburg, New York 10962, USA. Fax: (914) 359 7029

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Classification of countries as developed or developing

The DOSMD study adopted a dichotomous classification of countries and used it to report its major findings in terms of similarities and differences in patient outcomes (Jablensky *et al*, 1992). We have adopted the same classification in order to maintain consistency with other analyses of the same data-set that have been reported, and also because we believe that the classification was valid at the time of data collection. There are, of course, many issues that can be raised about any such dichotomous classification. For example, on a national level, were Czechoslovakia and the Soviet Union developed or developing countries in the 1970s when the data were collected? On an individual level, were patients seen in the Prague and Moscow centres provided with services that were comparable to those provided by the centres in other Western countries? We are not aware of any systematic data-based comparison of mental health services that could illuminate the issue.

The label 'developed' may apply to a country as a whole, but it must be remembered that the data used in the analysis emanate from a non-random sample of mental health facilities in the countries in the study. Indeed, the participating centres are an 'elite' group who work closely with the WHO. These collaborating centres are not necessarily typical of their countries, and it is not known whether their patients are either. Furthermore, the countries themselves are not a random sample and may not even be representative of the development class to which they are assigned. Of course, within every country there is large variation in the resources available and the services provided to patients from one community to another. From this perspective, an appropriate analysis of the data should take into account the availability of services and the resources of the service system operating at each centre, the cultural context, as well as the patient-specific clinical and demographic information. Such an approach would not trivialise the factors affecting the rate of violence by relating it to a dichotomous classification. Unfortunately, such data are just not available, and so we are left with the approach used by Jablensky *et al* (1992).

It is interesting to note that an alternative classification of centres has been empirically derived in a recent re-analysis of the outcome DOSMD data (Craig *et al*, 1996). In this work the classification of countries was not developed or developing, but was based on the similarity of the distributions of the two-year outcome.

Unexpected finding

The lack of relationship between drug use and a history of assault in the developed countries is puzzling. Drug use is a well-known predictor of assaultive behaviour in

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patients with schizophrenia in developed countries (Lindqvist & Allebeck, 1990; Volavka, 1995). However, the referenced studies focus primarily on chronic patients in partial remission, whereas the subjects in the current study had only recently made their first lifetime contact with a helping agency. Thus, the present sample may not be comparable to those that suggest that drug use is a risk factor.

Future research

Future studies of violent behaviour in schizophrenia, whenever possible, should be prospective in nature. The dependent variable (violence) should be carefully defined, and information concerning it should be collected repeatedly from multiple sources, including self-reports, families, service providers, as well as law enforcement and criminal justice bodies. The frequency, seriousness, and consequences of the patient's assaultive behaviour should be ascertained. Information about the presence and type of psychotic symptoms at the same time that an assault occurred is important. Without information on temporal linkage it is difficult to evaluate the association between assaultive behaviour and schizophrenia. Effects of prescribed antipsychotic treatments (and patients' adherence to these treatments) should be included among the information to be obtained. Finally, genotypes of assaultive patients and their relatives may reveal factors that predispose to violent behaviour. Interesting findings are already emerging from the studies of polymorphisms in tryptophan hydroxylase and catechol-O-methyl transferase.

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