

Article word count: 3987

May 2006

Abstract word count: 196

Violence and Psychiatric Morbidity in a National Household Population - A Report from the British Household Survey

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ABSTRACT

This study measured the prevalence of self-reported violence and associations with psychiatric morbidity in a national household population, based on a cross-sectional survey of 8,397 respondents in Great Britain. Diagnoses were derived from computer-assisted interviews, with self-reported violent behaviour over the previous 5 years. The 5-year prevalence of non-lethal violence in Britain was 12% (95%CI: 11-13%). Risk of violence was substantially increased by Alcohol dependence (OR 2.72; 95%CI: 1.85 – 3.98), Drug dependence (OR 2.63; 95%CI: 1.45-4.74) and Antisocial personality disorder (ASPD) (OR 6.12; 95%CI: 3.87 – 9.66). Low prevalences of these conditions (7%, 4% and 4% respectively) contrasted with their relatively high proportions of attributed risk of violence (23%, 15% and 15%). Hazardous drinking was associated with 56% of all reported violent incidents. Screening positive for psychosis did not independently increase risk (OR 3.20; 95%CI: 0.35-29.6). The study concluded that psychiatric morbidity makes a significant public health impact on violence exerted primarily by any personality disorder (PD), Substance dependence, and Hazardous drinking. Population interventions for violent behaviour are appropriate for hazardous drinking and targeted interventions for substance dependence and any PD. Despite public concern, the risks of violence from persons with severe mental illness were very low.

Key Words: violence; psychiatric morbidity; cross-sectional survey; attributable risk; antisocial personality disorder; substance dependence.

Abbreviations: CI, confidence interval; OR, odds-ratio; PAR, population attributable risk; ASPD Antisocial personality disorder.

The public health impact of mental disorder on violence depends on the base rate of violence in the general population. This may ultimately influence whether targeted “high-risk” or large-scale “population” strategies are chosen for violence prevention (1). For example, international homicide rates show wide variations between different countries, but rates among individuals with mental disorders are similar between countries and within the same countries over time (2). In geographical locations with low violence rates, the proportion attributed to mentally disordered persons may appear high and containing their violence will achieve public health and political prominence. In locations with high base rates, more relevant risk factors may include weapon availability, substance misuse, and gang violence. Nevertheless, there is consensus that mental disorder is related to violence (3-8), and increases risk of violence over the lifespan (9-13). However, patients with psychotic, affective and anxiety disorders have only moderately increased risks compared to the general population, with considerably greater risks from personality disorder (5, 14), substance misuse (5), and where these conditions are comorbid with personality disorder and substance misuse (3, 6-8).

We measured the prevalence of self-reported violent behaviour over the past five years, its association with individual categories of mental disorder, comorbidity, and the public health impact of psychiatric morbidity using the **population attributable risk** in a two-phase survey of a representative sample of adults (age 16-74) in households in Britain, conducted in 2000.

MATERIALS AND METHODS

Sample

Subjects aged 16 to 74 were sampled in the survey of Psychiatric Morbidity Among Adults Living in Private Households in England, Wales and Scotland in 2000. Details have been described previously (15). Computer-assisted interviews were carried out in this two-phase survey (16) by Office of National Statistics (ONS) interviewers. The Small Users Postcode Address File (PAF) was the sampling frame and the Kish Grid method (17) systematically selected one person in each household.

A total of 8,886 adults completed the first phase interview, a response rate of 69.5%. Of these, 8,397 (94.5%) completed all questionnaire sections. Among non-respondents, 24.0% were refusals, 6.5% non-contacts. There was no information on psychiatric status of non-respondents to conclude whether attrition resulted in biased estimates in prevalence of violence. However, weighting procedures applied throughout the analyses took into account proportions of non-respondents according to age, sex, and region to ensure a sample representative of the national population, compensating for sampling design and non-respondents in the standard error of the prevalence, and controlling for effects of selecting one individual per household.

Measurement of psychiatric morbidity

Participants screened positive for psychosis if any two of four criteria were currently present from the Psychosis Screening Questionnaire (PSQ) (18). The SCID-II screening questionnaire (SCID-II Screen) (19) identified personality disorder. Subjects gave 'yes' or 'no' responses to 116 questions on laptop computer. Ten categories of DSM-IV Axis-II disorder were created by manipulating cut-off points to increase levels of

agreement, measured by the kappa coefficient, between both individual criteria and clinical diagnoses. These were obtained using the Structured Clinical Interview administered by trained interviewers in a previous survey of prisoners (20). The same algorithms were used in the present survey. Ten categories of lifetime personality disorder could be derived from the Screen, but were combined into a single category of “any” personality disorder for this study. For some analyses, participants with Antisocial personality disorder (ASPD) were analysed separately.

The revised version of the Clinical Interview Schedule (CIS-R) (21) was used to obtain the prevalence of common mental disorders in the past week, (affective and anxiety disorders) including generalised anxiety disorder, mixed anxiety and depression, depressive episodes, phobias, obsessive-compulsive disorder, and panic disorder. These six syndromes were combined into a single category of “any” affective or anxiety disorder. The principal instrument to assess alcohol misuse over the past year was the Alcohol Use Disorders Identification Test (AUDIT), which defines hazardous alcohol use (score of 8 or more) as an established pattern of drinking which brings risk of physical and psychological harm over the previous year (22). The Severity of Alcohol Dependence Questionnaire (SADQ) (23) was included to measure alcohol dependence. A number of questions designed to measure drug use were included in the Phase I interviews. Positive response regarding a series of different substances (cannabis, amphetamines, cocaine, crack cocaine, ecstasy, tranquilisers, opiates, and volatile substances) to any of five questions measuring drug dependence over the past year were combined to produce a single category of “any” drug dependence (15).

A category of “no psychiatric disorder” was applied to respondents who did not have personality disorder, affective or anxiety disorder, drug or alcohol dependence, or

possible psychosis.

Measurement of violent behaviour

All subjects were asked questions about violent behaviour in the first phase of the study in the context of establishing the diagnosis of ASPD. These included questions from the conduct disorder section, including whether they had started fights and had threatened or hurt anyone with a weapon before the age of 15 years. In addition, they were asked if they had been in a fight and had used a weapon in a fight since age 15 years. As we intended to retain the diagnostic category ASPD in subsequent analyses, we included an additional question used in previous surveys in New York (4) and Israel (5). Subjects were asked “Have you been in a physical fight, assaulted or deliberately hit anyone in the past five years?”

Statistical analysis

To estimate the prevalence of violent behaviour in the population of Great Britain, weights were used to account for unequal selection of probabilities in the two-phase sample survey. Detailed procedures in constructing weighting variables were given by Singleton et al. (24). Based on the second phase sample, comparisons between unweighted and weighted prevalence of personality disorders showed considerable differences. Weighted results are a more accurate representation of the general population, and weighted analyses were therefore performed throughout.

To measure violent behaviour by demography and diagnostic categories, cross-tabulation with weighting factors were carried out in SPSS (version 12). Adjusted odds-ratio estimates for violent behaviour by demographic factors and clinical syndromes were carried out using two-level hierarchical weighted logistic regression analyses in

MLwiN (25) which takes into account clustering effects of violent behaviour within survey areas. Adjustments were mainly for 'static' attributes of respondents, including age, gender, marital status, and social class. The adjusted model was fitted for each diagnostic category entered in comparison with the category 'no psychiatric disorder'. This established magnitude of associations between violent behaviour and each diagnostic category, controlling for 'static' factors and other clinical syndromes.

PAR was calculated for each diagnostic category and some comorbid conditions (26). In the absence of an incidence of violent behaviour due to the cross-sectional method, relative risk was approximated by the odds ratio together with the representative prevalence in the total population.

RESULTS

Prevalence of violent behaviour

Weighted data excluding missing data included 8,397 respondents (4179 men, 4278 women) of whom 982 (12%) reported violent behaviour in the last five years. The prevalence of self-reported violence among men (749, 18%) was three times that among women (233, 6%). As expected, the prevalence of reporting fighting across the lifespan since 16 years was higher in all respondents (2,148, 26%), and among males was more than 4½ times (1,771, 42%) that of women (377, 9%). One hundred and fifty five (2%) reported using a weapon in a fight since 16 years, 137 (3%) men, 18 (0.4%) women. A total of 566 (7%) reported starting fights before the age of 15, 416 (10%) men, 150 (4%) women. A total of 267 (3%) reported threatening or hurting someone with a weapon before 15 years, 231 (6%) men, 36 (1%) women.

Table 1 demonstrates that being young, male, of lower socioeconomic status, single, separated, or divorced, and being in part-time work or economically inactive were independently associated with self-reporting violent behaviour. Violence was less prevalent among persons of Asian origin and declined progressively with age.

Diagnostic categories and violence

Of 982 respondents reporting violent behaviour in the preceding five years, 644 (66%) met survey criteria for any psychiatric disorder, compared to 2,767 (37%) non-violent respondents (OR 3.19, 95% CI 2.77-3.67, $p < 0.001$). Table 2 demonstrates that violence among men was approximately twice that in women for most diagnostic categories, except ASPD and psychosis where prevalences were similar in women. However, the prevalence for men was almost four times that of women with “no disorder”.

Prevalences of any affective/anxiety disorder, any personality disorder, and screening positive for psychosis were more than twice as high in violent male respondents. However, in women the prevalences of violence were higher among those with any affective/anxiety, personality disorder, and those who screened positive for psychosis than among women with no disorder. Although the prevalence of Hazardous drinking, Alcohol dependence, Drug dependence, and Antisocial personality disorder were lower among women, the prevalence of reported violence among women with these conditions was higher than men.

Comorbidity and violence

The effect of multiple diagnoses on risk of violence is demonstrated in [Table 2](#). There is a positive association between the number of diagnoses and prevalence of violence, with prevalences approximately doubling as the number of diagnoses increase from

none through to three or more. Table 3 also shows the relationship between specific combinations of diagnostic categories, suggesting that the effects of substance dependence on reported violence when comorbid with affective/anxiety disorder, or any personality disorder was greater than comorbid combinations of these two conditions. However, the table also demonstrates that substance dependence did not entirely explain the association between mental illness and violence, as the prevalence of violence over the past five years was elevated among respondents with affective/anxiety disorder, or personality disorder, or the combination of the two in the absence of substance dependence comorbidity. The elevated prevalence of reported violence in the combination of psychosis and substance dependence diagnosis was not significant due to small number of respondents.

Multivariate analysis

Table 3 demonstrates independent effects of psychiatric morbidity on self-reported violence in the past five years, controlling for demography and effects of confounding from comorbid diagnoses. Compared to the no psychiatric disorder category, all diagnostic categories were associated with increased risks of reporting violence except screening positive for psychosis, which was not significant after adjustments. The highest risk of violence was associated with ASPD. This independently increased the risks over six times compared to persons with no psychiatric disorder.

Public health impact of psychiatric morbidity on violent incidents/individuals

Table 4 demonstrates the potential public health impact of psychiatric morbidity on violent events and violent individuals. This is shown in two ways: firstly by the **population attributable risk percent, which is the proportion in the population that could be prevented by eliminating exposure to the risk factor of each category of mental**

disorder; secondly, by the number of violent events reported by respondents in each diagnostic category. This represents a simple measure of the proportion of violent incidents accounted for by respondents within each category, or which might have been removed from the total had the sample not been exposed to each risk factor.

The majority of respondents did not have a psychiatric diagnosis and accounted for almost a third of all violent incidents. Diagnoses with relatively high prevalences in the population such as affective/anxiety disorder and personality disorder accounted for relatively large proportions of all violent incidents. This was particularly the case for hazardous drinking, accounting for over half of all incidents. In contrast, subjects screening positive for psychotic illness constituted a very small percentage of respondents with psychiatric morbidity and accounted for a very small percentage of all violent incidents. However, respondents with alcohol dependence, drug dependence, and ASPD, whilst of relatively low prevalence in the population, accounted for a relatively high proportion of all incidents.

The PAR for each diagnostic category in Table 4 demonstrates that eliminating psychosis as a risk factor for violence among persons with this diagnosis would have had an almost negligible impact on the percentage of individuals reporting violence in the past five years. However, eliminating hazardous drinking would have reduced it by almost a half. Eliminating affective/anxiety disorder or any personality disorder would have had a relatively low impact on individuals reporting violence despite these conditions having high prevalences. However, eliminating less prevalent risk factors such as alcohol and drug dependence and ASPD would have had a moderate impact. Although comorbidity of substance dependence, any personality disorder and

affective/anxiety disorder were associated with high risk of violence, these diagnoses had moderate public health impact (Table 4) due to their low prevalences.

DISCUSSION

Comparison with previous surveys

The survey demonstrated that psychiatric morbidity among adults living in households in Britain increases risk of violent behaviour, replicating previous survey findings in the USA and Israel (3-5). However, it adds to the current body of knowledge in this area by quantifying the public health impact and indicates future approaches to intervention. Use of illicit drugs, hazardous drinking, personality disorders, and affective/anxiety disorders all increased risk, as in previous studies. However, screening positive for psychosis was not independently associated with violence after controlling for demographic factors and comorbidity. Alcohol and drug dependence and antisocial personality, substantially increased the risk of reporting violence. In addition, diagnostic comorbidity substantially increased this risk, with a doubling of prevalence at each stage from no diagnosis, to three diagnostic categories or more. This almost exactly replicated earlier findings of Swanson and colleagues (3) in the USA who used different diagnostic categories derived from clinical interviews.

The survey also suggests that non-lethal violence is a problem of similar magnitude in Britain compared to the USA. A weighted national prevalence of 12.2% in persons aged 19-59 years is comparable to 15.1% in a predominately working-class population in Upper Manhattan using similar measures (4). In contrast, young persons in Israel reported a prevalence of only 5.2% (5), compared to 17.4% for respondents in the same age group in Britain. In the Epidemiological Catchment Area study in three US sites 15 years earlier, reported fighting before age 15 was higher in US respondents but lower in

adulthood than in the present survey (27). Similarities in rates of non-lethal violence are supported by surveys of crime victims and police statistics which demonstrated a fall in crime in the USA up until 1996 compared to a rise in England and Wales (28). Thus, whilst the murder rate remains markedly higher in the USA, crime rates for assault and robbery are slightly higher in England and Wales (29). Taken together, these findings suggest that the base rate of violence is relatively high in Britain and that factors other than psychiatric disorder make the highest impact.

As in previous surveys, being young, male, single, separated or divorced, and economically inactive substantially increased the risk of reporting violence, irrespective of psychiatric illness. Belonging to an ethnic minority did not increase risk after controlling for social class and other confounders, although persons of Asian or Oriental origin were less likely to report violence, particularly women. However, the association between the measure of socioeconomic class used in this survey did not show the linear relationship demonstrated by Swanson et al. (3) using a composite score based on occupation, education, and income ranking. This could reflect differences in measures but also differing patterns of violence among young males in Britain, where those in social classes IIINM and IIIM engage in similar levels of violence to those in social classes IV and V, and are violent in settings associated with heavy drinking.

Among subjects with mental disorder, women demonstrated lower prevalences of reported violence than men in every diagnostic category. However, when compared to respondents with no disorder, the presence of psychiatric morbidity in women increased risks of violence more than men. Previous authors (10, 12) have also demonstrated that major mental disorder is associated with greater increase in risk of criminal offending for women than for men. Theoretical explanations include the possibility that women

are more vulnerable to effects of psychiatric illness on their behaviour, and the threshold/paradox hypothesis which argues that females who develop antisocial behaviour surmount a higher threshold of risk than males and are therefore more severely afflicted (30).

Psychotic, affective, anxiety disorders and violence

We found that a combined category of affective and anxiety disorder independently increased the risk of reporting violence. This contrasted with a survey in Israel which also controlled for other disorders and demography (5). Violence attributable to persons screening positive for psychotic illness had almost negligible impact on the overall level of violence at the population level despite public concern over risks from seriously mentally ill persons, both in Europe and the USA. Furthermore, their risk was not increased independently above persons with no disorder in this study. This was unexpected as previous population studies have found associations between psychotic disorders and violent behaviour. This may have resulted from study limitations: firstly, using a screen to identify participants with psychosis; secondly, low prevalence of respondents screening positive for psychosis compared to other diagnostic categories; thirdly, the sampling-frame excluded prisoners, the homeless, and psychiatric inpatients who have higher prevalences of violent behaviour.

A strength of the study was elimination of potential confounders. This resulted in failure to demonstrate an independent association with psychotic illness (whilst confirming it for other diagnostic categories). Previous population surveys have demonstrated that psychiatric patients (4) and those with schizophrenia and manic-depressive psychosis (3, 5, 8) are more likely to report violence after controlling for demography. However, not all controlled for ASPD (3, 4, 8) or substance abuse (4). A case register study in

Australia, found greatly reduced associations between schizophrenia and violent convictions after controlling for substance misuse (31). Four birth cohort studies have demonstrated associations between schizophrenia, schizophrenic spectrum disorder, manic-depressive psychosis and violent offending (9-13). However, only one controlled for both personality disorder and substance abuse (12) and only Stueve & Link (5) controlled for additional confounding from other non-psychotic, Axis I disorders. These studies confirmed independent associations, but in populations with low base rates of violence.

Antisocial personality disorder

A targeted approach to individuals with substance dependence and antisocial personality disorder was partly supported by a relatively large percentage of violence among people with these conditions, but the relatively small proportion of the population with these diagnoses. Although national surveys have demonstrated prevalence ranges from 0.6-4%, persons with ASPD constitute a large number of individuals, beyond the resources of the criminal justice system or mental health services. The finding that approximately half do not report violence indicates problems of accuracy in identifying those posing future risks. Furthermore, evidence on effectiveness of mental health services to intervene once these conditions are established in adulthood remains limited.

Methodological limitations

There are several study limitations. Violent behaviour within the last five years was assessed via self-report. This measure was restricted and we did not include objective information such as arrests or convictions. Moreover, self-report may have underestimated true prevalence, as socially undesirable behaviours tend to be less frequently reported. Diagnoses of Axis I and Axis II mental disorders were also derived

from self-report questionnaires in the first phase of the survey. Research diagnostic instruments were administered by clinically trained raters in the second. However, the second-phase sample was considerably smaller and prevalences were insufficient for detailed statistical analyses. Specific limitations may lie in use of self-report assessments of personality disorder (32), although it has been questioned whether clinician assessments are by definition superior (33). Some clinical re-appraisal interviews may be of value. As described elsewhere (15), a stratified second phase sample of over 600 respondents were assessed by clinical interviewers using the SCID-II (34) interview. Comparison of clinical and self-report diagnostic categories demonstrated very good specificity and sensitivity but poor positive predictive value for clinician rated categories, indicating an area for future development of feasible epidemiological assessment methods (35). The 31.5% non-responders were less likely to be White, more likely of lower social class and lower educational level. This could introduce bias through underestimating the true prevalence. As differences in violent behaviour among ethnic groups were not significant, and the weighting procedure took into account certain non-response factors, the underestimation bias may not be severe, and our findings regarding risk factors should remain valid.

Prevalences of mental disorders in the only comparable previous survey in Great Britain (36) demonstrated close similarities, except substance misuse categories which had substantially increased. Data were weighted by post-stratification to national population totals to compensate for known differences in response by age, sex and geographic region. Social class was associated with prevalence of violence. However, distributions of occupational groupings for those who had ever worked in our survey were similar to those currently working in the 2001 national census. This suggested that there were no major biases with respect to social class within the survey data.

Dating of episodes of mental disorder proved difficult and it was not identified whether violent incidents related to time periods when symptoms were present. Apart from ASPD and drug dependence, the number of individuals reporting violence was relatively small. This might have complicated the statistical analyses and should be considered when interpreting results. However, the community-based design and large sample size allowed us to examine associations between different categories of mental disorders and violent behaviour without introducing selection bias associated with treated samples. Furthermore, the sample size provided sufficient statistical power to test complex models and control for confounding from demographics and co-morbidity.

Public health implications of alcohol, drug misuse, and violence

The public health approach to violence has generated more interest in the USA (37) than the UK (38), where homicide is the second leading cause of death for Americans aged 15-34, the leading cause of death for young African-Americans, and where average ages of both violent offenders and victims have become progressively younger (39, 40). However, high annual medical and social costs of injury from deliberate harm are highlighted by measures from UK emergency rooms. These correlate with unemployment, poverty and, in particular, expenditure on alcohol (41, 42). Alcohol misuse and its relation to violence, particularly binge-drinking, has generated increasing public and political concern in the UK following a marked increase in licensed premises selling alcohol over the past 25 years (43) and legislative changes relaxing the selling of alcohol. Research into alcohol-related disorder highlights the concentration of violent and public order offences in urban areas with high densities of licensed premises which peak at weekends. This has emerged within planned regeneration of certain inner urban areas in the UK, but where competition between licensed premises designed to

accommodate large numbers of drinkers, resulting in cheaper alcohol, the financial resources available to the UK Alcohol industry (facilitating more effective litigation to overcome objections of residents and regulations of local authorities), coupled with an inherent culture of binge-drinking, have compounded these problems (44).

In this survey, the highest percentage of incidents and highest **population attributable risk** were explained by individuals engaging in hazardous drinking, followed by drug misuse. Measures of the public health impact used in this study assume a direct association between diagnostic categories and violent behaviour, which cannot be verified in a cross-sectional survey. Furthermore, associations between drug misuse and violence may result more from involvement in the illegal economy of drug markets than effects of intoxication (45), and where criminal justice control of drug use through law enforcement outweighs public health interventions. However, studies of alcohol use and violence have confirmed strong, if complex, associations with hazardous drinking (46). As the proportion of respondents reporting hazardous drinking in Britain was substantial, particularly among younger men, this indicates that “population” approaches involving risk-reduction programmes to encourage healthy drinking and control of outlets, particularly those associated with drunken disorder, many within the “night-time economy” (44), are more appropriate preventive interventions (46). Using Rose’s (1) model, a relatively small reduction in exposure to the risk factor of hazardous drinking at the individual level (which affects a relatively large proportion of the population) could result in a relatively large overall impact on the population’s behaviour in association with drinking.

Acknowledgements: Funded by the Department of Health (England). Contracts to the Office for National Statistics, Social Survey Division, London, which carried out fieldwork.

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TABLE 1. Prevalence of violence in last 5 years by demographical characteristics and odds ratio (OR) adjusted for each other by logistic regression analysis

Background	Male		Female		Overall	Adjusted OR (95% CI)
	Weighted response	(%)	Weighted response	(%) Violent	(%) Violent	
<u>Age:</u>						
16 - 34	1529	(36)	1474	(12)	(24)	Ref.
35 - 54	1642	(11)	1640	(3)	(7)	0.32 (0.26-0.40)
55 - 74	1011	(2)	1104	(0)	(1)	0.05 (0.03-0.08)
<u>Social class:</u>						
I + II	1549	(9)	1216	(3)	(7)	Ref.
IIINM + IIIM	1681	(21)	1816	(5)	(13)	2.06 (1.64-2.60)
IV	569	(22)	730	(9)	(15)	2.47 (1.84-3.33)
V	163	(27)	284	(4)	(12)	2.22 (1.45-3.41)
<u>Ethnicity:</u>						
White	3850	(18)	3958	(6)	(12)	Ref.
Black	108	(18)	73	(11)	(15)	0.70 (0.37-1.31)
Asian or Oriental	118	(11)	106	(3)	(7)	0.33 (0.14-0.75)
Other	79	(23)	69	(6)	(15)	1.16 (0.57-2.36)
<u>Marital status:</u>						
Married	2298	(9)	2373	(2)	(5)	Ref.
Separated	93	(13)	141	(9)	(11)	2.11 (1.38-3.22)
Single	1403	(35)	1090	(13)	(25)	2.15 (1.71-2.71)
Divorced	298	(17)	372	(8)	(12)	2.77 (2.04-3.77)
Widowed	77	(1)	237	(0)	(0)	0.26 (0.04-1.95)
<u>Employment:</u>						
Full-time work	2700	(17)	1412	(6)	(13)	Ref.
Part-time work	365	(31)	1161	(6)	(12)	1.51 (1.13-2.03)
Unemployed/ economically inactive	1086	(16)	1635	(5)	(9)	1.34 (1.02-1.76)

TABLE 2. Prevalence of respondents reporting violent behaviour in last 5 years by number and categories of self-report diagnoses, and adjusted odds ratio from logistic regression analysis

Diagnostic group	Weighted N	(%) violent	Adjusted OR (95% CI)
No disorder (Reference)	4979	(7)	1.0 (-)
Any one disorder	2322	(14)	2.2 (1.7 – 2.7)
Any two disorders	895	(25)	4.7 (3.6 – 6.2)
Any three or more disorders	190	(47)	8.2 (5.6 – 11.9)
<u>One diagnostic group:</u>			
Affective/anxiety disorder only	523	(9)	2.3 (1.6 – 3.4)
Any personality disorder only	1456	(11)	1.8 (1.5 – 2.3)
Psychosis +ve only	6	(17)	2.1 (0.10 – 42.7)
Substance dependence only	336	(37)	3.0 (2.2 – 4.2)
<u>Two diagnostic groups:</u>			
Psychosis + Affective/anxiety	30	(13)	2.4 (0.53 – 11.2)
Psychosis + any PD	32	(16)	1.7 (0.48 – 5.9)
Affective/anxiety + any PD	767	(23)	4.4 (3.5 – 5.7)
Psychosis + substance dependence	9	(33)	3.3 (0.55 – 20.3)
Affective/anxiety + substance dependence	240	(44)	7.6 (5.5 – 10.5)
Any PD + substance dependence	408	(52)	8.9 (6.9 – 11.6)
<u>Three or more diagnostic groups:</u>			
Psychosis, affective/anxiety + any PD	25	(12)	1.8 (0.43 – 7.6)
Psychosis, affective/anxiety + substance dependence	8	(25)	2.0 (0.30 – 13.2)
Psychosis, any PD + substance dependence	8	(25)	3.3 (0.53 – 20.2)
Any PD, affective/anxiety + substance dependence	168	(52)	9.1 (6.2 – 13.3)
Psychosis +ve, affective/anxiety, any PD, substance dependence	6	(33)	2.2 (0.32 – 15.6)

Note: substance dependence can be either alcohol dependence or drug dependence, or both. Adjustments included age, sex, social class, marital status and employment. Each group was compared with the group of no disorder.

TABLE 3. Weighted logistic regression analysis of associations between psychiatric morbidity (self-report diagnosis) and violence in past 5 years.

Diagnosis (adjustments are in brackets)	Men	Women	Total				
	Weighted N (%violent)	Weighted N (% violent)	Weighted N (% violent)	Unadjusted OR 95% CI		Adjusted OR 95% CI	
No disorder (Reference)	2365 (11)	2603 (3)	4979 (7)	1.00	(-)	1.00	(-)
Any affective/anxiety disorder (1, 2, 4-6)	558 (28)	809 (19)	1367 (17)	3.53	(2.87-4.34)	2.49	(1.62-3.83)
Any personality disorder (1, 3-6)	1337 (26)	1135 (10)	2472 (19)	3.63	(3.05-4.33)	2.30	(1.80-2.94)
Drug use (1-3, 6,8)	566 (48)	327 (23)	893 (39)	12.6	(10.1-15.7)	1.96	(1.80-2.75)
Drug dependence (any) (1, 2-4, 6)	229 (60)	91 (31)	320 (52)	19.7	(14.7-26.4)	2.63	(1.46-4.74)
Psychosis screen +ve (1, 2-5)	25 (24)	26 (19)	51 (22)	3.41	(1.69-6.87)	3.20	(0.35-29.6)
Hazardous drinking (AUDIT 8+) (1-3, 6-7)	1564 (31)	654 (14)	2218 (26)	7.37	(5.97-9.09)	2.52	(1.97-3.23)
Alcohol dependence (1-3, 5-6)	498 (46)	123 (29)	621 (43)	11.3	(9.01-14.1)	2.72	(1.85-3.98)
Antisocial personality disorder (1, 3-6)	268 (51)	73 (41)	341 (49)	19.1	(14.5-25.2)	6.12	(3.87-9.66)
Ever psychiatric admission (1)	93 (26)	108 (10)	201 (17)	1.60	(1.08 – 2.37)	2.17	(1.40 – 3.35)

Adjustments for logistic regression

- 1 = Sex, age, social class III-V, marital status, employment
- 2 = Any personality disorder
- 3 = Any affective/anxiety
- 4 = Alcohol dependence
- 5 = Drug dependence
- 6 = Psychosis screen +ve
- 7 = Drug use
- 8 = Hazardous drinking

TABLE 4. Public health impact of diagnoses on violent incidents and violent individuals in the last 5 years

Diagnosis	Weighted N (%) of respondents (n=8397)		Weighted N (%) of violent Respondents (n=982)		Population Attributable Risk % (SE)		Weighted N (%) of violent events (n=4351)	
No disorder	4979	(59)	338	(34)	–	–	1375	(32)
Any affective/anxiety disorder	1367	(16)	235	(24)	10.3	(1.7)	1179	(27)
Any personality disorder	2472	(30)	456	(47)	26.4	(2.2)	2084	(48)
Psychosis screen +ve	51	(0.6)	12	(1)	0.7	(0.4)	91	(2)
Hazardous drinking (AUDIT 8+)	2217	(27)	575	(59)	46.8	(2.0)	2441	(56)
Alcohol dependence	621	(7)	266	(27)	23.4	(1.5)	1253	(29)
Drug use	893	(10)	348	(35)	36.8	(1.7)	1831	(42)
Drug dependence (any)	320	(4)	164	(17)	14.9	(1.2)	957	(22)
Antisocial personality disorder	341	(4)	166	(17)	14.9	(1.2)	949	(22)
Ever psychiatric admission	201	(2)	34	(4)	1.2	(0.6)	200	(5)
Any personality disorder + substance dependence	408	(5)	212	(22)	19.4	(1.4)	840	(19)
Affective/anxiety disorder + substance dependence	240	(3)	106	(11)	9.2	(1.0)	468	(11)
Affective/anxiety + any personality disorder	767	(9)	176	(18)	10.8	(1.4)	820	(19)
Affective/anxiety + any personality disorder + substance dependence	168	(2)	87	(9)	7.8	(0.9)	414	(10)

Note: For the calculation of Population Attributable Risk (PAR) each diagnosis was compared to others without the diagnosis. For example, the prevalence of Affective/anxiety disorder among the non violent population, $P_{aff} = (1367-235) / (8397 -982) = 0.153$, and the Odds ratio for this disorder compared to the rest is $OR_{aff} = (235 \times 6283) / (1132 \times 747) = 1.75$, and its $PAR = P_{aff}(OR_{aff}-1) / (1 + P_{aff}(OR_{aff} - 1)) = 0.103$, and its $SE = \sqrt{[(747 \times 7415 / 6283 / 982)^2 (235 / 747 / 982 + 1132 / 6283 / 7415)]} = 0.017$.