Trends in community violence in England and Wales 1995–1998: an accident and emergency department perspective

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Abstract

***Objectives*—To identify overall, seasonal, sex and age specific national trends in community violence from an accident and emergency (A&E) department perspective.**

***Design and Setting*—Prospective collection of national violence data from a stratified random sample of 33 A&E departments in England and Wales.**

***Methods*—Data were analysed for the three years from May 1995 to April 1998. Time series statistical methods were used to detect trends among those aged 0–10, 11–17, 18–30, 31–50 and 51 + years.**

***Results*—121 475 assaults were identified: 89 533 (74%) men sustained injury. Forty five per cent were aged 18–30. The significant trends were an increase in injured women and those aged 31–50. Significant seasonal trends were identified for both sexes and all age groups: peaks were found in July to September and troughs in February to April.**

***Conclusions*—There was no overall significant change in levels of violence between 1995–1998 from an A&E department perspective. Numbers of women injured and those aged 31–50 increased significantly. The incidence of injury sustained in community violence is biphasic: is highest during July to September and lowest during February to April. National A&E department violence surveillance provides a unique perspective.**

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Violence has become an important public health issue in UK.[1] The consequences of violence: fatal and non-fatal injury and psychological harm are left to health professionals to treat. Violence research in the accident and emergency (A&E) department has demonstrated the substantial extent to which offences that result in hospital treatment are not recorded by the police,[2] that seriousness of injury is not a good predictor of outcome in the criminal justice system and that some categories: street and licensed premises violence, domestic violence and violence directed against men are less likely to be recorded by the police.[3]

Currently, national data on violence in England and Wales come from two main sources, Police Crime Statistics and The British Crime Survey (BCS). Both have recognised shortcomings. In addition to undercounting many categories of violence, they do not provide objective information about injury.[4 5] Importantly, threefold to 10-fold more violent offences that occur in the community result in hospital treatment than are recorded by the police.[6] Epidemiological studies are required to identify environments, circumstances and communities where the incidence of violence is higher or lower so that violence reduction programmes can be based on reliable evidence. Single centre studies have demonstrated the potential for local measurement of the effectiveness of violence reduction initiatives and local policing using A&E derived injury data[7 8] but no country has attempted a national systematic injury surveillance to facilitate this.

Health authorities are included in the Crime and Disorder Act (1998)[9] as bodies with whom local authorities and the police must collaborate to audit and tackle crime. Evidence indicates that over 95% of those who are treated for injuries sustained in violence are treated in A&E departments.[7] In the UK, A&E departments are therefore the principal potential source of violence data for Health Authorities. A&E surveillance has become possible because of the development of information technology (IT) and the identification of

Figure 1 A&E departments and health regions.

Table 1 Software systems in use in the 33 A&E departments

Software	*Number of A&E departments*
PAS	15
Footman and Walker	9
ReMaSS	5
MPI	1
CAMIS (Seamans)	1
EDS	2
Total	33

PAS = Patient Administration System; MPI = Management Patient Information; CAMIS = Computer Assisted Management Information System; EDS = Electronic Data Set.

particular health workers who can reliably enter data (receptionists). The current A&E modernisation programme focuses, among other objectives, on further development in IT and "front door" services.[10]

The aim of this study was to perform the first national A&E department-based survey of community violence in order to identify overall, seasonal, sex and age specific national trends.

Methods

England and Wales is served by 226 major (24 hour emergency cover with on site medical and nursing staff) A&E departments in nine health regions (Northern & Yorkshire, Trent, North-west, West Midlands, Eastern, South West, South East, London, and Wales). Altogether, 109 A&E departments had retrievable computer records for patients presenting since January 1995. A stratified random sample of 33 was selected from this pool, strata being defined as the health regions (fig 1). Several software packages had been installed (table 1) and the flow diagram (fig 2) demonstrates how data are captured in most A&E departments. Attendance dates and age and sex of patients who reported injury in assaults were analysed for the three year period; May 1995 to April 1998. Overall national trends were compared with those found in BCS and official Police Crime Statistics.

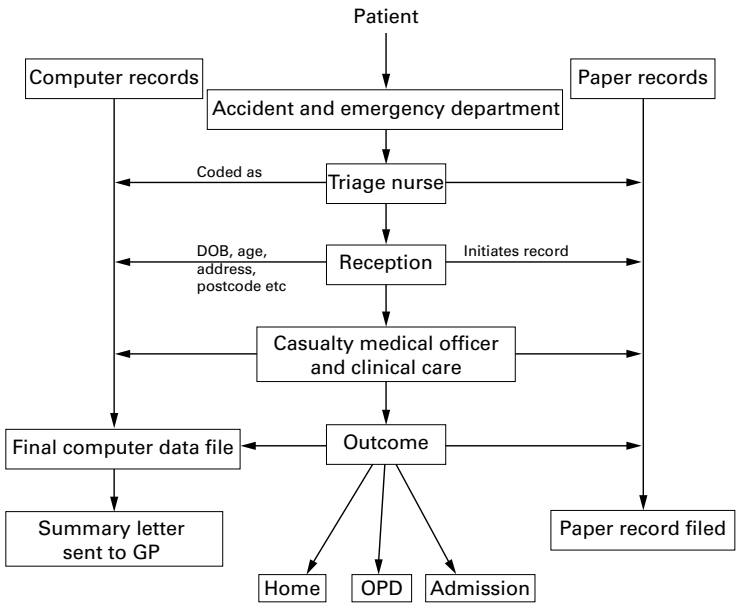

Figure 2 Flow of patients in most A&E departments.

Time series statistical methods were used to look for linear trends in total violence and violence affecting men and women both at regional and national levels.[11] Five age groups (0–10, 11–17, 18–30, 31–50, 51 + years) were identified and separate time series analyses were carried out. Underlying trend was studied by taking the average of three consecutive months (that is, current, previous and following months) and comparing these moving averages to the average of the corresponding months in the previous year. Deterministic cycles of violence such as significant seasonal effects were also investigated. To investigate linear trends a simple model was used.

$$Y_t = \alpha + \beta t + \varepsilon_t, t = 1, \ldots, 36 \quad (1)$$

where Y_t = number of assaults in month t, α = constant, β = constant, ε = error term.

The best such model was obtained by the least square regression method. For a seasonal effect a statistical model to detect seasonal patterns was fitted. As monthly data were the focus of interest the model is given by:

$$y_t = \alpha + \beta t + \sum_{r=1}^{h}\left[a_r \sin\left(\frac{2\pi}{p}tr\right) + br\cos\left(\frac{2\pi}{p}tr\right)\right] + \varepsilon_t, t = 1, \ldots, 36, \quad (2)$$

where h is the largest integer not exceeding p/2. P is defined as the period of the model and $2\pi/p$ is defined as the frequency of the cyclic fluctuations. Sine and Cosine functions within square brackets indicate the seasonal model that fitted our data. Usually, in practice, a smaller h suffices. The value of h was chosen by looking at the lack of fits and in this study h=4.

Results

Altogether 109 A&E departments in England and Wales satisfied the selection criteria. Table 2 shows the number of assaults recorded by health region and sex for the random sample of 33 A&E departments for the three year period. In all, 121 475 assaults were recorded: 2.5% of all A&E attendance (n = 4 842 936). A total of 89 533 (74%) of the injured were men and 31 942 (26%) were women. Distribution of the injured is shown in figure 3. Highest rates of attendance were by those aged 18 to 30, followed by those aged 31 to 50, those aged 11 to 17, those over 50 and those aged 0 to 10. This order was maintained throughout the three year period.

LINEAR TREND FOR AGE AND SEX

Overall there was a steady increase in male and total attendance throughout the study period although this was not statistically significant. A p value of <0.05 was taken to be significant. Seven (21%) of the 33 A&E departments showed a significant increase in total attendance of those injured in assaults (Northern

Table 2 Assault patient attendance by region and sex

	May 1995 to April 1996			*May 1996 to April 1997*			*May 1997 to April 1998*		
A&E departments by Health Region	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*
Trent									
Bassetlaw (Worksop)	598	258	856	538	224	782	519	260	779
Derby RI	1 756	595	2 350	1 790	626	2 416	1 914	708	2 623
Doncaster RI	1 686	649	2 335	1 771	728	2 499	1 900	788	2 688
Northern G (Sheffield)	365	171	536	553	267	820	556	269	825
North West									
Countess of Chester	1 654	479	2 133	1 519	436	1 955	1 522	473	1 995
Royal Preston	1 213	409	1 622	1 118	367	1 485	1 022	382	1 404
Whiston (Prescot)	2 017	729	2 746	1 961	761	2 722	1 911	729	2 640
Northern and Yorkshire									
Dewsbury	659	301	960	623	302	925	682	288	970
Royal Halifax	575	243	818	666	278	944	813	353	1 166
Hartlepool G	687	283	970	833	317	1 150	683	311	994
Huddersfield RI	499	193	692	488	184	672	506	222	728
Wansbeck G (Ashington)	641	284	925	706	277	983	780	281	1 061
West Midlands									
Good Hope (Sutton Coldfield)	1 116	348	1 464	1 240	415	1 655	1 166	375	1 541
The General (Hereford)	391	117	508	414	123	537	516	147	663
Princess Royal (Telford)	454	184	638	517	221	738	525	222	747
Selly Oak (Birmingham)	2 113	725	2 838	2 092	706	2 798	1 775	657	2 432
Eastern									
Broomfield (Chelmsford)	391	117	508	414	123	537	516	147	663
Colchester G	515	214	729	537	203	740	489	195	684
Hinchingbrooke (Huntingdon)	274	96	370	271	103	374	543	237	780
Southwest									
Cheltenham G	309	130	439	280	96	376	300	127	427
Frenchay	712	187	899	373	135	508	432	187	619
Salisbury District	280	84	364	276	81	357	271	84	355
Torbay	621	210	831	661	218	879	607	229	836
North Devon District (Barnstaple)	143	58	201	226	75	301	183	59	242
Southeast									
Wycombe G (High Wycombe)	653	250	903	701	235	936	698	228	926
District General (Eastbourne)	604	190	794	623	173	796	556	193	749
Royal Sussex (Brighton)	1 368	391	1 759	1 504	431	1 935	1 469	382	1 851
Stoke Mandeville (Aylesbury)	606	221	827	622	190	812	577	217	794
London									
Kingston	796	246	1 042	846	261	1 107	1 033	359	1 392
Lewisham	859	434	1 293	828	422	1 250	906	504	1 410
Wales									
Cardiff Royal	2 428	741	3 169	2 387	638	3 025	2 301	605	2 906
Morriston (Swansea)	1 690	649	2 339	1 923	627	2 550	1 891	673	2 564
Glan Clwyd (Rhyl)	590	166	756	642	187	829	765	269	1 034
Total	29 263	10 352	39 615	29 943	10 430	40 273	30 327	11 160	41 487
%	73.9	26.1		74.2	25.8		73.1	26.9	

General Sheffield; Royal Halifax; Hereford General; Broomfield, Chelmsford; Hinchingbrooke, Huntingdon; Kingston, Kingston upon Thames and Glan Clwyd, Rhyl) and four (12%) showed a significant decrease (Countess of Chester; Royal Preston; Selly Oak; Birmingham and Cardiff Royal Infirmary). Overall there were significant increases in attendance of women and those aged 31 to 50 years. There were small, non-significant increases for men and other age categories.

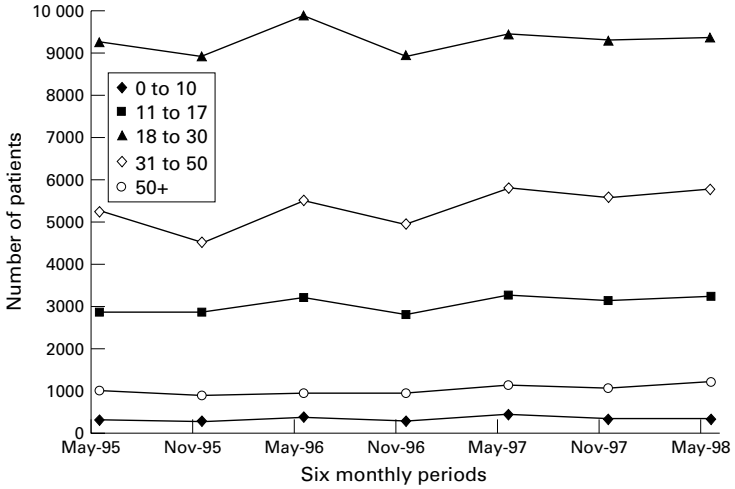

Figure 3 Attendance by age category for sequential six month periods: May 1995 to Apri11998.

SEASONALITY FOR AGE AND SEX

Derby; Dewsbury; Princess Royal Hospital, Telford; and Royal Sussex Hospital, Brighton A&E data demonstrated a significant seasonal component for male, female and total assault attendance with peaks during July to September and troughs during February to April. Seasonality was also significant for total attendance in Sheffield, Preston, Halifax, Huddersfield, Torbay, Aylesbury, Lewisham, Swansea and Rhyl with two peaks, during July to September and a second smaller peak during November to January, and a trough during February to April. Interestingly, this pattern of high attendance in the summer and low attendance in winter was repeated for total male and female populations in this sample (fig 4A, 4B). The 18–30 and 31–50 year age groups were very similar in seasonality with increased A&E attendance during July to September and decreased attendance during February to April with a smaller peak during November to January. Similarly, younger (0–10 and 11–17 years) and older (≥50 years) groups showed consistent peaks during July to September and consistent troughs during January to April. The same seasonality was observed when Northern (Trent, Northwest, Northern &

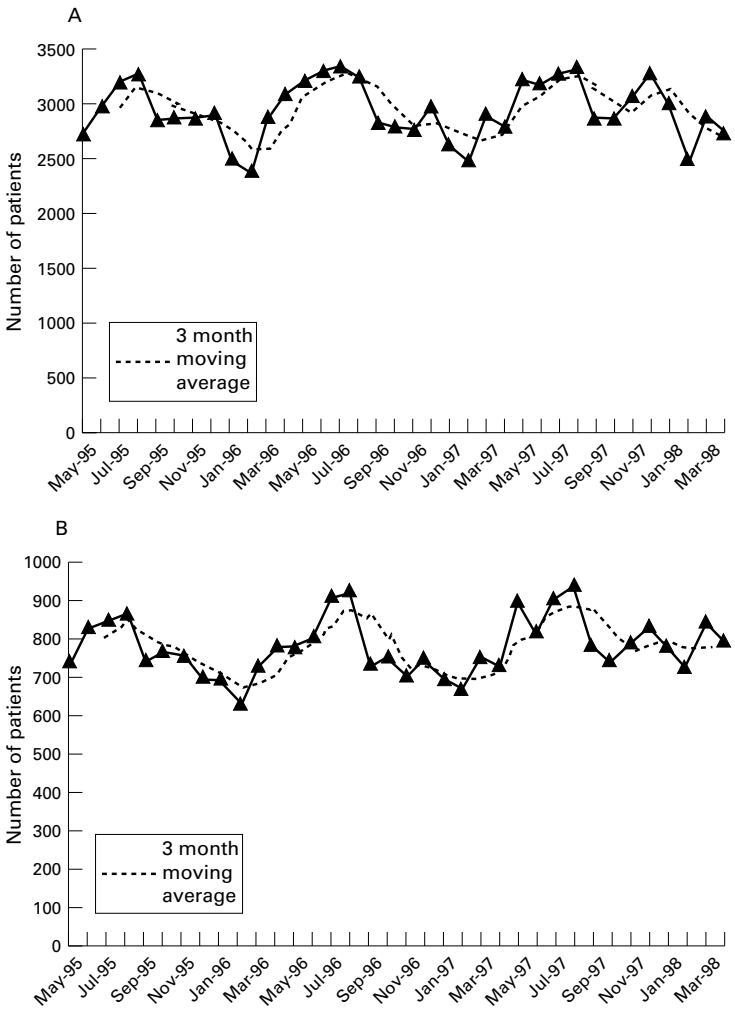

Figure 4 (A) Total attendance for men, and three month moving averages. (B) Total attendance for women and three month moving averages.

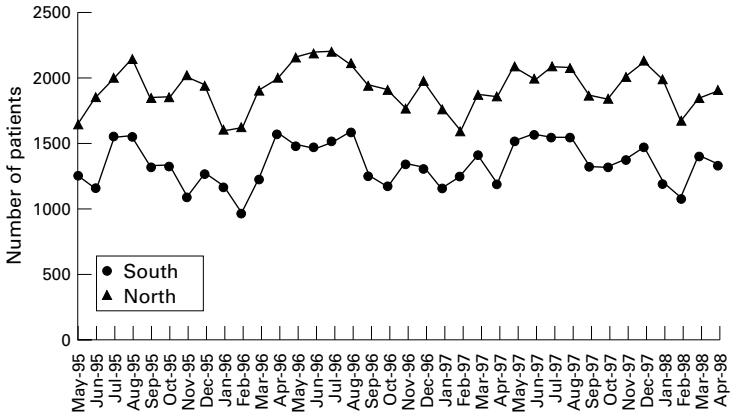

Figure 5 North to South comparison in seasonality.

Yorkshire, and West Midlands) and Southern (Eastern, Southwest, Southeast and London) data were compared (fig 5).

Discussion

The reasons why many violent offences are not reported to the police include inability to identify the assailant, fear of reprisals, an ongoing relationship with the assailant, a hostile attitude to the police and lack of facilities or encouragement to report in A&E departments.[12] Furthermore, many violent offences that produce injury are not recorded or investigated when they have been reported: incidents may be classified as domestic rather than criminal or the injured may be found or alleged to have been responsible for what happened.[13] Police records are also subject to changes in detection, reporting and recording practices.[5]

The BCS was initiated in response to increasing statistical and criminological evidence that crime statistics collected by the police did not reflect the true incidence of crime in England and Wales. Home office BCS interviewers ask one person over the age of 16 years in each of 11 000 randomly selected households in England and Wales about their experience of crime in the past year. There have now been eight sweeps of the survey, at roughly two yearly intervals since the first BCS in 1981. The BCS is thought to undercount some categories of violence, including bar and street fights and domestic violence, and provides insufficient data for small area variations, seasonal trends and the effect of regional crime reduction initiatives or local police performance to be measured.[4 5] As violence related injury varies with age and geographical setting,[4] a clear understanding of the epidemiology of these injuries is essential for the development of primary, secondary and tertiary injury prevention.

An advantage of A&E data is that case identification depends not on the perception that a crime has been committed, but on the presence of injury deemed to require hospital treatment. All 33 hospitals included in this study had a minimum dataset (MDS) incorporated into their A&E software that allowed capture of demographic data. Six different software packages were found to be in use (table 1). Trained receptionists and nurses enter patient details into the database. Some information was available about the circumstances of assault, such as locations, but incompleteness meant that reliable analysis of assault location was not possible. A mandatory assault MDS is therefore necessary: modifications to allow comparability of A&E and Home Office data, have been agreed with the authors of the BCS and have recently been published.[10]

It is important that future A&E-based violence surveillance takes account of the effect of variations in access to A&E departments.[14] This means that minor injuries treatment centres need to be included. Equally importantly, measurement of trends must take account of changes in location of A&E services and reconfiguration of catchment populations.

In this study, the number of A&E attendees reporting injury in assault increased from 39 615 during 95/96 to 41 487 during 97/98: a rise of 1872 (5%), which is less than the overall 10% (from 319 675 to 352 873) rise in violent crimes recorded by the police in England and Wales in the same period.[5] The 1998 BCS,[4] relating to crime in 1997 however, demonstrated a 17% decrease in violent offences compared with 1995. In the A&E study reported here men and those aged 18–30 years

were most likely to be victims of violence and those over 50 were at lower risk. This is in agreement with the 1998 BCS.[4]

It has been found that most assaults involving men occur in public places where "individual worth and identity are at stake" in confrontations with other men.[7] Attendance of men reporting injury in assaults increased over the period 1995–8 but, interestingly, only attendance of women and those in the 31–50 age group increased significantly. As BCS data show a decrease in domestic violence of 16% between 1995 to 1997,[4] it is possible that violence involving women in public places increased. In a previous single centre study, rates of injury from street and licensed premises violence for women were higher than rates from domestic violence.[7]

Significant seasonality was evident in 69(26%) of the 264 time series analyses (for male, female, total and age categories for the 33 hospitals). Assaults affecting men, women and the 11–17, 18–30 and 31–50 age groups peaked during the summer months between July to September and were at their lowest during February to April. It has been suggested in a single centre study that during the summer months, when larger numbers of people are out of doors, there is greater likelihood of violence.[8] Interpretation of the significant seasonality in attendance shown by 0–10 and ⩾51 year groups is difficult because of small numbers. Nevertheless, the finding that assault injury is a seasonal disorder seems particularly important.

Information about community violence collected in the A&E department is recorded very shortly after injury when the event is fresh in the minds of the injured and those who accompany them. A recently published questionnaire[10] allows collection of data on particular Home Office categories of violence so that in future, trends in domestic, acquaintance and stranger violence can be studied. This should be incorporated into the A&E software throughout England and Wales. A&E departments react to needs of patients who seek, or who are brought for treatment and are less likely to be prone to the reporting and recording biases known to affect police ascertainment of offences. This study shows that the collection of sound local and national epidemiological data on violence is achievable and that A&E departments have an important potential role in contributing to community safety, measuring the effectiveness of violence prevention initiatives and informing local police strategy. Importantly, this study was possible without additional expenditure in the A&E departments.

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