The epidemiology of assault across the West Midlands

A Downing, S Cotterill, R Wilson

Objectives: The purpose of this study is to look at accident and emergency (A&E) attendances and admissions after assault in the West Midlands NHS region across a wide range of acute units.

Methods: This study used data from two sources, the A&E Minimum Data Set and the Hospital Episode Statistics database. Analyses were based on data from 12 of the 21 acute trusts in the West Midlands NHS region for the period 1 April 1999 to 31 March 2000.

Results: Analyses were performed on 15,969 A&E attendances and 1,596 admissions. Some 67.4% of attenders and 84.2% of those admitted were male. The mean age of the patients was between 27 and 29 years. Attendance peaked between 21:00 and 02:59, especially on Friday and Saturday night. The most common injury was to the head. Some 75.3% of A&E attenders were discharged home. The average stay in hospital was two days and six deaths were recorded. Those living in the most deprived areas were nearly four times more likely to be admitted than those in the least deprived areas (175.9 per 1,000 compared with 45.1 per 1,000).

Conclusions: This study shows assault is predominately a male phenomenon, worst in the evenings and at weekends, and is positively related to deprivation. It is probable that the levels recorded will be an underestimate, however with some additions to the information collected hospital records could create the basis for a comprehensive surveillance system.

Methods: The study uses data from two sources, the A&E minimum dataset (MDS), and the Hospital Episode Statistics (HES) database. The A&E MDS is collected in computerised A&E departments and contains information on every A&E attendance, such as the injuries sustained and others have concentrated on female assault patients. However, most of these studies have been based on attendances or admissions in one A&E department and hence may not be generalisable to other areas. The purpose of this study is to examine A&E attendances and admissions after assault in the West Midlands NHS region across a wide range of units.

Methods: The study uses data from two sources, the A&E minimum dataset (MDS), and the Hospital Episode Statistics (HES) database. The A&E MDS is collected in computerised A&E departments and contains information on every A&E attendance, such as the injuries sustained and others have concentrated on female assault patients. However, most of these studies have been based on attendances or admissions in one A&E department and hence may not be generalisable to other areas. The purpose of this study is to examine A&E attendances and admissions after assault in the West Midlands NHS region across a wide range of units.
The records do not include those that die outside of hospital or die of complications after discharge. The data do not distinguish between victims and injured perpetrators and relies on the medical staff to record the cause of the injury as an assault.

Links with deprivation were investigated using the Townsend Index as a measure of deprivation. Each patient was assigned into a Townsend quintile based on postcode of residence, and this was used to calculate a quintile specific age/sex standardised assault admission rate.

RESULTS

There were a total of 17,055 attendances at A&E after assault recorded during the study period (1 April 1999 to 31 March 2000). This represents 1.9% of 887,289 A&E attendances. This ranged from between 369 and 2965 attendances at each hospital. A total of 1,086 (6.4%) of the A&E records were missing one or more of the necessary fields, therefore analyses were carried out on 15,969 records.

There were 1,618 admissions after assault recorded during the study period, out of a total of 1.2 million records in the HES database. The numbers of assault patients being admitted ranged from 44 to 341 across the hospitals. Twenty (1.4%) records were incomplete therefore analyses were carried out on 1,596 records.

Demography

Table 1 shows the demographic profiles of the two datasets. Male attendances at A&E peaked between 15 and 24 years (43.0% of male attendances), whereas female attendances peaked in the 24–44 age group (45.9% of female attendances). Admissions peaked in the 23–44 age group (46.1% of men and 38.1% of women). The number of male patients is higher than female patients in all groups except the over 75 year olds. Admissions peaked in the 24–44 age group (45.9% of female attendances). Some 67.4% of A&E attenders and 84.2% of those admitted were male. The mean age of the attenders was 27 and 29 years for men and women respectively, and for those admitted it was 28 and 29 years.

Temporal trends

Figure 1 shows attendances by hour and by day for both sexes. Throughout the week attendances peaked during the evening and early hours of the morning. The largest peaks were on Friday and Saturday night (11.3% and 9.6% of all attendances were between 2100 and 0259). These peaks were more pronounced for male attenders than female attenders.

Overall male attendances were highest between 2300 and 0259 whereas female attendances were highest between 2100 and 0059. Peak attendance was between 0000 and 0059 for those aged between 15 and 64 years. In those aged under 15 the proportion of attendances was higher in the early evening (1700–2159). Attendances were more evenly distributed throughout the day in those over 65 years, with the highest proportion of attendances between 1800 and 1959.

When looking at attendance by day those between 15 and 74 attended most frequently at the weekend, while those aged under 15 attended more frequently between Monday and Friday. The main difference between the sexes was that the proportion of female attendances was slightly higher than that in males between Monday and Thursday, with the proportion of male attendances being higher on Fridays, Saturdays, and Sundays. The pattern of admissions followed that of attendances, with a higher percentage occurring at the weekend (46.2% of males and 39.7% of females). Most male patients were admitted on a Saturday (25.1%) and most women were admitted on a Sunday (22.2%).

The highest number of A&E attendances occurred on New Year’s Day, with 134 patients visiting A&E after an assault. The lowest number of attendances in one day was 13 (Tuesday 21 December) and the median was 40 attendances.

Arrival mode

The mode of transport used to get to A&E is coded as being by ambulance or by any other means of transport. Table 2 shows the percentage in each age group arriving by either method; 30.2% of patients arrived by ambulance. This was highest in the over 75 age group (70.1%) and lowest in the 5–14 age group (12.3%). Ambulance use was mainly throughout the evening and night, with 82.2% of all ambulance arrivals occurring between 1800 and 0559. 61.0% of “other” arrivals occurred during this time period. Some 13.6% of patients arriving by ambulance were admitted compared with only 4.5% of those arriving by other means of transport.

Table 1

<table>
<thead>
<tr>
<th>Age group</th>
<th>Attendances Male</th>
<th>Attendances Female</th>
<th>Admissions Male</th>
<th>Admissions Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>31</td>
<td>16</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>5–14</td>
<td>791</td>
<td>296</td>
<td>64</td>
<td>27</td>
</tr>
<tr>
<td>15–24</td>
<td>4935</td>
<td>1348</td>
<td>504</td>
<td>73</td>
</tr>
<tr>
<td>25–44</td>
<td>4588</td>
<td>2055</td>
<td>620</td>
<td>96</td>
</tr>
<tr>
<td>45–64</td>
<td>1045</td>
<td>450</td>
<td>136</td>
<td>30</td>
</tr>
<tr>
<td>65–74</td>
<td>60</td>
<td>51</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>75+</td>
<td>41</td>
<td>62</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>11,491</td>
<td>4,478</td>
<td>13,44</td>
<td>2,52</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Age band</th>
<th>Ambulance</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>28.6</td>
<td>71.4</td>
</tr>
<tr>
<td>5–14</td>
<td>12.3</td>
<td>87.7</td>
</tr>
<tr>
<td>15–24</td>
<td>27.2</td>
<td>72.8</td>
</tr>
<tr>
<td>25–44</td>
<td>32.1</td>
<td>67.9</td>
</tr>
<tr>
<td>45–64</td>
<td>42.9</td>
<td>57.1</td>
</tr>
<tr>
<td>65–74</td>
<td>50.6</td>
<td>49.4</td>
</tr>
<tr>
<td>75+</td>
<td>70.1</td>
<td>29.9</td>
</tr>
<tr>
<td>All ages</td>
<td>30.2</td>
<td>69.8</td>
</tr>
</tbody>
</table>

Figure 1 A&E attendance by hour and day.
Injuries sustained
Analysis of the diagnosis information from two A&E departments, where ICD10 is used, revealed that the most common reason for visiting A&E was head injury. Injuries to the head and face, such as a wound to the lip, scalp, or eye area were among the 10 most common diagnoses in both departments, as were injuries to the thorax and the hand.

Figure 2 shows the injuries sustained by body region in patients that were admitted.

Head and neck injuries accounted for the largest proportion of admissions (69.2% of males and 59.0% of females).

Disposal from A&E
Some 75.3% of A&E attenders were discharged home with no further treatment. This varied across age groups, with most 5–14 year olds (84.4%) and least over 75 year olds (66.3%) being discharged. Some 7.1% of all attenders were admitted or transferred to a hospital ward. This was highest for the 0–4 and over 75 years olds (15.9% and 17.8% respectively). When looking at sex differences, a higher proportion of male patients were admitted than female patients (8.2% compared with 4.3%).

Thirteen per cent of patients were referred to an outpatient’s clinic, and 3.1% received no treatment in the department either because they refused it or they left before seeing a doctor.

Outcome
The average length of stay in hospital was 1.9 days for males and 2.4 days for females (see table 3). However, this varied greatly across different age groups, with the length of stay being greater at both ends of the age spectrum. There were three deaths recorded in the A&E data, all of whom were male. Of those admitted three died (one male and two female).

Deprivation
There was a positive relation between deprivation, as measured by Townsend quintile, and the incidence of assault (see fig 3). The age/sex standardised assault admission ratio increased from 45.1 per 1000 (95% confidence intervals 39.5 to 51.3) in the least deprived quintile to 175.9 per 1000 (165.9 to 187.4) in the most deprived.

DISCUSSION
Assault accounted for 1.9% of all attendances at A&E, however this is probably only the tip of the iceberg. According to the British Crime Survey 2000, 4.2% of adults in England and Wales were the victims of violent crime in 1999, but of these only 14% sought medical attention from a doctor. This equates to a rate of 5.9 per 1000 (7.4 for males and 4.6 for females), which compares well to the overall rate of 5.1 per 1000 found in this study and 7.4 per 1000 for males. However, the study rate of 2.8 per 1000 for females attending A&E is much lower than the British Crime Survey estimate and may represent a reluctance of women to seek medical attention or to admit to the cause of their injury, or a greater prevalence of minor injuries.

The highest rates were found in males aged 15–19 and 20–24 (23.7 and 20.1), which reflect findings elsewhere. In fact, males accounted for 67% of A&E attendances and 84% of admissions in this study. There was little difference in the age profiles, with mean ages for A&E attendances and of 27 and 29 years for males and females respectively.

It has been reported that alcohol consumption is related to assault, with 60%–70% of those suffering physical violence having been found to have a positive blood alcohol level at the time of the attack. Alcohol licensing laws mean that most bars and pubs have to be vacated by 2330, and clubs by 0200, therefore most alcohol related incidents occur around these times. Results from this study followed this pattern with 52.2% of attendances occurring between 2000 and 0359. However, most hospitals do not collect blood alcohol measurements and it is not routinely recorded in their data, therefore this study cannot add to these findings or look at alcohol as a risk factor for assault.

There were some differences between males and females in the day of admission. Most male patients were admitted on a Saturday whereas more females were admitted on a Sunday (22.2%). There are no data available to investigate the reasons for this, but it could be attributable to some delay in presenting or be specific to certain types of assault.

Altogether 3805 patients arrived at A&E by ambulance (30.2% of all attendances), with over 80% of these occurring between 1800 and 0559. Further information is needed to know whether the incidents occurring during this time were more serious than those occurring at other times of the day. There was a general trend of an increase in ambulance use and be specific to certain types of assault.

The injuries sustained are not unexpected, being predominantly to the head for both attenders and those admitted.
Shepherd were admitted. The large number of upper limb injuries may reflect a tendency on the part of the victim to defend themselves by using their arms, or the result of the assailant or defendant striking the other person. In general the physical outcomes for assault patients are good. Some 75.3% of assault attenders in this study were discharged home, and there were only six deaths recorded across the two datasets. For those admitted the average length of stay was greatest in those aged over 75 in males and over 65 in females. Older people are also more likely to have other conditions that may complicate and lengthen their hospital stay. This study found fewer patients being admitted than in other studies. Makower et al found 12% were admitted, and Shepherd et al found that 16% of males and 18% of females were admitted. However, these studies were much smaller and based in single A&E departments, which may have allowed them to achieve a higher level of case ascertainment. This study shows that 8.2% of males and 4.3% of females were admitted to a hospital bed, suggesting that the injuries sustained by males are more severe than those by females. There was a large variation in the proportion of patients admitted in different age groups, with admissions being lowest in the 5–14 year old age group (3.9%) and highest in the over 75s (17.8%).

The number of patients admitted from A&E does not match the numbers recorded in HES due in part to different information systems in A&E and the rest of the hospital, and the possibility that patients give differing information at different times. It also depends upon the judgment of the doctor as to whether they record it as an assault. A patient may not be prepared to admit they have been involved in an assault, either through fear of reprisal or of police involvement. The assault literature focuses mainly on adults therefore it is unclear whether the numbers in the 0–4 age group are a true reflection of the incidence of assault in children. There is also the possibility of data being recorded inaccurately as there is no mandatory quality control when inputting data. Therefore it is likely that the lower number of assaults recorded in routinely collected data will be an underestimate.

Socioeconomic factors seem to play a part in predicting the likelihood of being injured in an assault. It was found that those living in the most deprived quintile were nearly four times more likely to be admitted after an assault than those living in the least deprived quintile. Similar results have been found by Howe and Crilly. A weakness of using routinely collected data is that they are based on residence, not incident location. Therefore it is not possible to look at assault rates according to where assaults occur, or whether people are assaulted in the area in which they live.

There are several ways in which this work could be expanded to produce more detailed information on assault. One of these is the inclusion of police data. This would identify the proportion of assaults that are not reported to the police, and could provide information about the attacker, the incident location, and the type of attack. Another is the use of ambulance data, which can provide information such as conscious level, Glasgow coma score, and blood loss. Record linkage techniques could be used to follow up patients from the ambulance into A&E, and from A&E into hospital if admitted. These datasets allow for longitudinal study and therefore trend analysis.

The methods described here permit an opportunistic insight into the issue of assault. There are gaps in our knowledge, however this is a cheap and replicable methodology that can be used in most health regions. With more diligence in the data collection process the A&E MDS and HES databases could contain useful and good quality information to study every aspect of the patient pathway. These databases could be improved to collect more specific information about the assault incident, in particular the location and the influence of alcohol, and create the basis for a comprehensive surveillance system, which can then be used for prevention purposes.

ACKNOWLEDGEMENTS

The authors would like to thank the Department of Health for providing access to HES, and the Trusts and Health Authorities involved for making the A&E data available. The data used in this study came from the following Trusts: Birmingham Heartlands and Solihull NHS Trust, Burton Hospitals NHS Trust, Dudley Group of Hospitals NHS Trust, North Staffordshire Hospital NHS Trust, Royal Shrewsbury Hospitals NHS Trust, Royal Wolverhampton Hospitals NHS Trust, Sandwell Healthcare NHS Trust, University Hospitals Coventry and Warwickshire NHS Trust, Walsall Hospitals NHS Trust, Worcestershire Acute NHS Trust, (comprising Alexandra Hospital, Kidderminster Hospital and Worcester Royal Infirmary).

Contributors

Richard Wilson was responsible for initiating and coordinating the study. All authors were involved in the design of the study. Amy Downing collected, processed, and analysed the A&E data. Sarafina Cotterill undertook the analyses involving HES data. Richard Wilson and Amy Downing jointly wrote the paper. Sarafina Cotterill made comments on drafts of the paper.

Authors’ affiliations

A Downing, S Cotterill, R Wilson, Department of Public Health and Epidemiology, University of Birmingham, Birmingham, UK

Funding: this work is funded by the Department of Health Public Health Development Fund and the West Midlands Regional Public Health Levy.

Conflicts of interest: none declared.

REFERENCES

The epidemiology of assault across the West Midlands

A Downing, S Cotterill and R Wilson

doi: 10.1136/emj.20.5.434

Updated information and services can be found at:
http://emj.bmj.com/content/20/5/434

These include:

References
This article cites 11 articles, 5 of which you can access for free at:
http://emj.bmj.com/content/20/5/434#BIBL

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/