

Relations between offending, injury and illness

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SUMMARY

The objectives of this study were to determine relations between offending and health, and how illness and injury relate to concurrent offending—whether offending predicts health or *vice versa*, and whether relations persist after adjustment for childhood predictors of offending. Data collected in the Cambridge Study in Delinquent Development were analysed. This is a prospective longitudinal survey of 411 South London males first recruited at age 8. Information about injuries and illnesses between ages 16 and 18 was set against information on offending and other types of antisocial behaviour.

Males who were injured (especially in assaults) tended to be convicted, to be violent, to have unskilled manual jobs and to be generally antisocial. Respiratory tract illnesses were negatively related to convictions and antisocial behaviour in general. Drug users were significantly likely to be ill. Adult convictions were predicted by childhood troublesome behaviour, daring/hyperactivity, low IQ/attainment, a convicted parent, family disruption/poor supervision and poverty. Assault injuries and respiratory tract illnesses did not predict adult convictions independently of these childhood factors.

It was concluded that injury is one symptom of an antisocial personality that arises in childhood and persists into adulthood. Therefore, measures that lead to a reduction in offending should also lead to a reduction in concurrent injuries. Negative relations between a range of antisocial behaviours and respiratory tract illness deserve further study.

INTRODUCTION

Offending is an important and increasing problem in many developed countries. It is part of a constellation of social disorders including truancy and substance abuse, some of which constitute self-evident health risks. Research has begun to establish links between offending and poor health and has suggested that offending might in some way cause poor health¹. Importantly, early contact with the police, truancy and school misconduct, divorce and psychiatric disorders are significant predictors of later premature mortality². A higher likelihood of mortality among offenders has been attributed largely to the existence of a small group of alcohol and/or drug abusers who are at excess risk of dying prematurely³.

Unique configurations of personality traits have been found to distinguish young adults involved in single health risk behaviours from those involved in multiple health risk behaviours^{4,5}. Impulsivity, aggression, alienation and a tendency to experience negative emotions in response to daily-life hassles characterize those taking single health risks;

rejection of social norms, danger seeking, impulsivity, a very low threshold for negative emotional responses (such as anger, irritability and nervous tension) and little need or capacity for relationships with other people have been found to characterize those taking multiple health risks⁶.

There is increasing research on victims of crime, who often seek treatment for physical or psychological injury. Prompted by an interest in the psychological impact of victimization, the study of illness behaviour of victims has revealed a typical pre-assault medical history known as DATES syndrome—comprising drug abuse (characterized by overdoses), intentional and accidental trauma, and elective surgery^{7,8}. This unique illness behaviour has been explained in terms of impulsivity and overlap between assault injury and offending; victims of assaults who seek treatment in accident and emergency departments (AEDs) have a substantially higher likelihood of a history of convictions than victims of accidents with similar injuries⁹.

Attempts to explain the observed association of criminal behaviour, accident involvement and injuries have focused on control theory, which explains behaviour in terms of the ways children are socialized, particularly through parental care and control^{10–12}. Early life circumstances and parental influences affect later mental health and behaviour. Poor social control has been offered as an explanation of

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increased risk of accidental injury, but there has been no longitudinal research on the links between offending and other kinds of injury and illness. We hypothesized that offending is associated with increased rates of injury and illness and that it might be associated with particular causes of injury and categories of illness.

METHODS

By use of data from the Cambridge Study in Delinquent Development (CSDD), which includes data on injuries and illnesses as well as offending, we sought to answer four questions. First, how are illnesses and injuries at age 16–18 related to offending and concurrent antisocial behaviour? Second, are health and offending related at the same age, does offending predict health, or does health predict offending? Third, how far do relations between health and offending hold up when childhood predictors are controlled for? Fourth, is it just that a bad background predicts both offending and health, or is there some causal link between offending and health?

The CSDD is a prospective longitudinal survey of the development of offending and antisocial behaviour in 411 London males¹³. At the time they were first contacted in 1961/1962, they were all living in a working class inner-city area of south London. The sample was chosen by taking all the boys who were then aged 8 to 9 and on the registers of six state primary schools within a one mile radius of a research office that had been established. Hence, the most common year of birth of these males was 1953. In nearly all cases (94%), the family breadwinner at that time, usually the father, had a working class occupation (skilled, semiskilled or unskilled manual worker). Most of the males were white (97%) and of British origin. The original aim of the study was to describe the development of delinquent and criminal behaviour in inner-city males, to investigate how far it could be predicted in advance, and to explain why juvenile delinquency began, why it did or did not continue into adult crime, and why adult crime usually ended as men reached their 20s.

A major aim in this survey was to measure as many factors as possible that might be causes or correlates of offending. The males were interviewed and tested in their schools (by male or female psychologists) when they were aged about 8, 10 and 14. They were interviewed in a research office at about 16, 18 and 21, and in their homes at about 25 and 32, by young male social science graduates. At all ages except 21 and 25, the aim was to interview the whole sample, and it was always possible to trace and interview a high proportion—for example, 389 out of 410 still alive at age 18 (95%) and 378 out of 403 still alive at age 32 (94%). The tests in schools measured individual characteristics such as intelligence, attainment, personality

and psychomotor impulsivity, while information was collected in the interviews about such topics as living circumstances, employment histories, relationships with females, leisure activities such as drinking and fighting, and offending behaviour.

In addition to these interviews and tests, the boys' parents were interviewed by female social workers who visited their homes. This happened about once a year from when the male was about 8 until he was aged 14 to 15 and in his last year of compulsory education. The primary informant was the mother, although many fathers were also seen. The parents provided details about such matters as family income, family size, their employment histories, their child rearing practices (including attitudes, discipline and parental disharmony), their degree of supervision of the boy and his temporary or permanent separations from them. Teachers completed questionnaires when the boys were aged about 8, 10, 12 and 14, to provide information about their troublesome and aggressive school behaviour, their attention deficits, their school attainments and their truancy. Ratings were also obtained from their peers when they were in the primary schools, about such topics as their daring, dishonesty, troublesomeness and popularity¹⁴.

For the analyses described in this paper, each predictor variable was dichotomized as far as possible into the 'worst' quarter (e.g. the quarter with lowest income or lowest intelligence) versus the remainder. This was done in order to compare the importance of different variables and also to permit a risk factor approach. Because most variables were originally classified into a small number of categories and because fine distinctions between categories could not be made very accurately, this dichotomizing did not usually involve a great loss of information. The one-quarter/three-quarters split was chosen to match the prior expectation that about one-quarter of the sample would be convicted as juveniles.

Searches were also conducted in the central Criminal Record Office in London to try to locate findings of guilt of the males, of their parents, of their brothers and sisters and later, of their wives and cohabitantes. The minimum age of criminal responsibility in England is 10. The Criminal Record Office contains records of all serious offences committed in Great Britain or Ireland and also acts as a repository for records of minor juvenile offences committed in London. Convictions were only counted if they were for offences normally recorded in the Criminal Record Office, such as thefts, burglaries, violence, vandalism and drug use. In this paper, the recorded age of offending is the age at which an offence was committed, not the age on conviction.

Injury and illness data were recorded for the 2-year period 16–18 in the following manner. Interviewers recorded all illnesses that led to absences from work of a

week or more in the previous 2 years, what was wrong, when the illness occurred, how it was managed, how many days off work it caused and the length of time if any in hospital. Men were also asked about operations and treatment that had been required. Accounts of these illnesses were amplified by the interviewers in free text. Information about injuries was recorded in precisely the same way except that men were asked about the circumstances and causes of injury.

The illnesses and injuries recorded by the interviewers were translated into Read clinical codes, version 3.1¹⁵. On the basis of the Read codes assigned illnesses were grouped into respiratory tract, skin, allergic, gastrointestinal and psychological/neurological disorders. Injuries were characterized by their cause. The main causes of injury were intentional (sustained in assault), motorcycle, home, industrial and sports-related. Data were analysed by means of the Statistical Package for the Social Sciences.

RESULTS

Of 387 boys coded, 258 (67%) experienced an illness between ages 16 and 18, and 211 (55%) experienced an injury. The most common type of illness was respiratory tract disease (e.g. colds, flu, asthma, bronchitis, 49%), followed by gastrointestinal disease (e.g. appendicitis, ulcer, gastric flu, food poisoning, 10%), skin disease (e.g. acne, boils, dermatitis, shingles, 9%), allergic illness (e.g. hay fever, allergic reaction, asthma, eczema, 6%) and psychological/neurological disorders (e.g. migraine, depression, nervous rash, nervous breakdown, 5%). The most common category of injury was industrial (21%), followed by sports (12%), assault (8%), motorcycle (6%) and home (6%).

Interrelation of types of illness and injury (Table 1)

Odds ratios (ORs) are used to summarize the strength of relationships. For example, illness and injury in general were unrelated: 53% of ill boys were injured, compared with 58% of the remainder (OR 0.82). Respiratory tract and gastrointestinal illnesses were negatively related. Respiratory tract and skin diseases were positively related to allergic illnesses, at least partly because of some overlapping definitions (asthma, for example, is both a respiratory tract illness and an allergic illness).

Illness and injury versus offending (Table 2)

The boys who were injured between ages 16 and 18 were significantly likely to be convicted at some stage (48% of those injured compared with 33% of the remainder: OR 1.81). The type of injury that was most related to convictions was injury caused by an assault (69% of those

Table 1 Interrelations of types of illness and injury

Variable 1	Variable 2	Odds ratio	(95% confidence interval)
Illness	Injury	0.82	(0.54–1.26)
Respiratory	Gastro	0.48	(0.24–0.97)
Respiratory	Allergic	3.76	(1.36–10.40)
Skin	Allergic	10.77	(4.25–27.27)
Industrial	Sports	0.35	(0.12–1.00)
Psychological	Home	4.54	(1.38–14.91)
Respiratory	Motorcycle	0.31	(0.12–0.78)
Skin	Sports	2.40	(1.02–5.66)
Gastro	Industrial	0.09	(0.01–0.68)
Allergic	Motorcycle	3.61	(1.12–11.62)

Table 2 Illness and injury versus offending

Variable 1	Variable 2	Odds ratio	(95% confidence interval)
Injured	Convicted 10–40 years	1.94	(1.28–2.94)
Assault	Convicted 10–40 years	3.48	(1.54–7.86)
Respiratory	Convicted 10–40 years	0.63	(0.42–0.95)
Injured	Convicted 15–18 years	2.30	(1.39–3.82)
Assault	Convicted 15–18 years	2.51	(1.15–5.47)
Assault	Convicted 10–14 years	2.19	(0.89–5.42)
Sport	Convicted 10–14 years	0.27	(0.06–1.15)
Injured	Convicted 19–40 years	1.81	(1.16–2.84)
Assault	Convicted 19–40 years	2.13	(0.97–4.68)
Respiratory	Convicted 19–40 years	0.64	(0.41–0.98)
Allergic	Convicted 19–40 years	0.32	(0.09–1.12)

injured were convicted, compared with 39% of the remainder: OR 3.48). Assault injury was particularly related to concurrent convictions (age 15–18) rather than previous convictions (age 10–14) or future convictions (age 19–40).

The boys who experienced illnesses were not significantly likely to be convicted (42%, compared with 41% of the remainder: OR 0.95). However, the boys who experienced respiratory tract illnesses at age 16–18 were significantly less likely to be convicted: 36% were convicted, compared with 46% of the remainder (OR 0.64). Respiratory tract illnesses were especially related to future convictions, rather than to concurrent or past convictions.

Concurrent antisocial behaviour (Table 3)

A combined measure of antisocial personality was developed at age 18, based on such factors as offending, violence, drug use, heavy smoking, heavy drinking,

Table 3 Illness and injury versus concurrent antisocial behaviour

Variable 1	Variable 2	Odds ratio	(95% confidence interval)
Injured	Violence	1.72	(1.03–2.89)
Assault	Violence	4.97	(2.28–10.81)
Illness	Drug use	1.65	(1.03–2.66)
Home	Heavy drinking	2.42	(1.03–5.72)
Injured	Heavy smoking	2.02	(1.26–3.23)
Industrial	Heavy smoking	2.59	(1.54–4.37)
Assault	Heavy smoking	2.35	(1.09–5.07)
Sport	Heavy smoking	0.55	(0.24–1.21)
Injured	Mot. conv.	2.40	(1.33–4.32)
Motorcycle	Mot. conv.	4.54	(1.95–10.53)
Sport	Mot. conv.	0.45	(0.16–1.31)
Assault	Unprotected sex	2.32	(1.03–5.21)
Respiratory	Unprotected sex	0.59	(0.35–0.98)
Skin	Unprotected sex	1.93	(0.90–4.11)
Injured	Low job status	2.00	(1.12–3.59)
Assault	Low job status	5.18	(2.34–11.44)
Psychological	Low job status	2.40	(0.88–6.51)
Injured	Low heart rate	1.72	(1.14–2.60)
Sport	Low heart rate	2.75	(1.44–5.25)
Injured	Antisocial	1.93	(1.17–3.18)
Assault	Antisocial	2.59	(1.19–5.66)
Respiratory	Antisocial	0.61	(0.38–0.99)

Mot. conv.=Motoring convictions

unprotected sex and an unstable job record. Boys who were injured tended to be more antisocial (28% of those injured, compared with 16% of the remainder: OR 1.93). The type of injury that was most related to an antisocial personality was injury caused by an assault (41% of those injured were antisocial, compared with 21% of the remainder: OR 2.59). In regard to the elements of an antisocial personality, assault injury was especially related to self-reported violence (getting into fights, starting fights, using weapons in fights), self-reported delinquency, anti-establishment attitudes (negative to police, school, bosses), antisocial-group membership, heavy smoking (20 cigarettes a day or more), having unprotected sex and an unstable employment record. An unstable job record was related to low job status (a manual job), and assault injury was strongly related to having a manual job (OR 5.18).

Illness in general was not related to an antisocial personality (23% of boys who suffered illnesses were antisocial, compared with 23% of the remainder: OR 1.02). However, the boys who experienced respiratory tract illnesses at age 16–18 were significantly less likely to be antisocial: 19% were antisocial, compared with 27% of the remainder (OR 0.61). In regard to the elements of an antisocial personality, respiratory tract illnesses were negatively

Table 4 Early precursors of convictions, assault injury and respiratory illness

Variable at 8–10 years	Odds ratio	(95% confidence interval)
Convictions 19–40		
Troublesome	2.58	(1.58–4.22)
Lacks concentration	2.79	(1.68–4.62)
Daring	2.12	(1.35–3.33)
Low IQ	2.15	(1.35–3.44)
Low attainment	3.83	(2.32–6.32)
Convicted parent	3.30	(2.08–5.26)
Disrupted family	2.24	(1.38–3.65)
Poor supervision	2.25	(1.32–3.82)
Large family	2.81	(1.75–4.51)
Low income	2.22	(1.37–3.59)
Low social class	1.89	(1.14–3.15)
Assault injury		
Troublesome	4.36	(2.01–9.46)
Daring	3.20	(1.49–6.90)
Low IQ	3.62	(1.68–7.82)
Large family	2.89	(1.33–6.26)
Low income	3.09	(1.42–6.70)
Respiratory illness		
Daring	0.46	(0.29–0.73)
Low income	0.59	(0.36–0.96)

related to anti-establishment attitudes and having unprotected sex. Therefore, less healthy boys were less antisocial. As mentioned, an unstable job record was related to low job status (a manual job) but respiratory tract illness was not significantly related to having a manual job (OR=0.59).

Early precursors

There is a great deal of previous research in the Cambridge Study on the early childhood precursors of offending. These fall into six major categories—antisocial child behaviour, impulsivity, school failure, an antisocial family, poor parenting and economic deprivation¹⁶. Table 4 shows that the major childhood (age 8–10) predictors of convictions between ages 19 and 40 were: troublesomeness (according to peers and teachers), poor concentration or restlessness (according to teachers), daring (according to peers and parents), low non-verbal IQ (90 or less on the progressive matrices), low junior school attainment, a convicted parent, a disrupted family (separation usually from the biological father), poor parental supervision, large family size (four or more siblings), low family income and low social class (an unskilled manual job of the family breadwinner).

In this study, assault injury positively predicted later convictions, while respiratory tract illness negatively

predicted later convictions. How far do these relations reflect the fact that certain childhood factors predict convictions, assault injuries and respiratory tract illness? Assault injury was predicted by troublesomeness, daring, low non-verbal IQ, large family size and low family income (Table 4). Respiratory illness was negatively predicted by daring and low family income; daring boys, and those from low-income families, were *unlikely* to have respiratory illnesses at age 16–18 (Table 4).

Logistic regression analyses showed that assault injury did not significantly predict convictions between ages 19 and 40 independently of troublesomeness, daring, low IQ, large family size and low family income. In fact, assault injury did not predict later convictions independently of troublesomeness alone. Logistic regression analyses also showed that respiratory tract illness did not significantly predict later convictions after adjustment for both daring and low family income, although it was almost a significant predictor after adjustment for only one of these childhood variables.

DISCUSSION

Injured males in this urban working class sample tended to be convicted, to be violent, to have unskilled manual jobs and to be generally antisocial. All of these factors were particularly characteristic of males injured in assaults. Assault injuries predicted future convictions.

Respiratory tract illnesses were negatively related to convictions, and predicted a low rate of future convictions. Respiratory tract illnesses were also negatively related to unprotected sex, to anti-establishment attitudes and to antisocial behaviour in general. Respiratory tract illnesses were negatively related to low job status. There are several potential explanations for the observed negative association between respiratory illness (largely upper respiratory tract infections), offending/anti-social behaviour and daring. First, offenders may be comparatively resistant to infections—because they grew up in large families, because of a more physically active lifestyle including having, predominantly, manual jobs (consistent with the negative relation between respiratory illness and low family income), or because drinking alcohol can protect against respiratory tract infections²⁰. Further, whereas injury is an immediate result of antisocial behaviour, illness consequent upon heavy drinking/drug use may have more cumulative effects that are not apparent at age 16–18. Second, offenders may not take time off work for respiratory tract infections. In the context of much temporary, precarious, employment in manual jobs, a week off may jeopardise income or employment. Further, those with a *macho* self image may be relatively intolerant towards time off for minor ailments. Third, respiratory tract illness may in some

way protect against offending—perhaps through limiting outdoor activity and visits to bars or by eroding physical fitness.

Adult convictions were predicted by several childhood factors—troublesome behaviour, daring/hyperactivity, low IQ/attainment, a convicted parent, family disruption/poor supervision and poverty. Assault injuries and respiratory illnesses did not predict adult convictions independently of these childhood predictors. However, this is probably because assault injuries and respiratory illnesses were weak predictors of adult convictions.

It is clear that offending and antisocial behaviour are positively related to getting injured. This observation fits with previous findings of links between offending and injury in assault⁹. It is possible that getting injured is another symptom or consequence of an antisocial personality, which arises in childhood and persists into adulthood. Therefore, measures that prevent or reduce offending and antisocial behaviour are likely also to reduce injuries. The most important prevention methods, targeted on childhood risk factors, involve parent education (especially advice given by home visitors to women in pregnancy and the first year of life of their baby), parent management training, preschool intellectual enrichment programmes and cognitive-behavioural skills training¹⁷. In addition, situational prevention methods, such as providing screens to protect bus drivers and utilizing toughened glasses in pubs, are effective in reducing injuries¹⁸. Offending is a public health issue¹⁹, and collaborative research between medical practitioners and criminologists is important in advancing knowledge about offending and about ill-health associated with offending.

Returning to the questions which are the basis of this study, these findings suggest firstly that the principal associations between health at 16–18 and offending and concurrent antisocial behaviour are a positive link with injury (particularly assault injury) and a negative link with respiratory tract illness. Secondly, health (mainly injury) and offending were related at the same age, but respiratory illness negatively predicted future offending. Thirdly, injury and respiratory tract illness did not predict offending independent of childhood factors such as troublesomeness, daring, low IQ, large family size and low family income. Fourthly, overall, this implies that a bad background is a precursor both to offending and to injury—but not, at 16–18, to illness. The surprising finding in this study was the negative relation between respiratory tract infections and concurrent and future offending. This deserves further study, particularly in the context of health behaviour.

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