Criminality and antisocial behaviour in unselected men with sex chromosome abnormalities

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INTRODUCTION

- The incidence of sex chromosome abnormalities (SCA) is 1.3 per 1000 male births for XXY and 1.0 per 1000 for XYY.
- Studies of men with SCA conducted during the 1960s and early 1970s suggested that affected individuals commit criminal acts more frequently than expected.
- All of these studies have the disadvantage of ascertainment bias as the SCA cases were preselected for antisocial behaviour and/or height.

METHOD 1

- The Newborn Cytogenetic Survey carried out by the Medical Research Council in Edinburgh screened consecutive, liveborn infants for abnormal numbers of X and Y chromosomes between 1967 and 1979.
- Two of the four maternity hospitals in Edinburgh participated in the survey, representing about 35% of all births of the city.
- The total number of infants screened was 34380; of whom 17522 were males and 16858 females.

METHOD 2

- Research Diagnostic Criteria (RDC) diagnoses.
- 21 items, four headings.

1. Poor occupational performance: frequent job changes, unemployment (unaccounted for by economic fluctuations), absenteeism.
2. Antisocial behaviour in school: truancy, expulsion, underachievement, breaking rules, running away, lying, alcohol, stealing, vandalism, early sex.
3. Antisocial behaviour after leaving school: arrested, divorced, physical fights, drunkenness, debts, vagrancy.
4. Markedly impaired capacity to sustain lasting, close, warm and responsible relationships: closeness, mutual support, duration of friendships.

METHOD 3

	Cases	Controls	Total
Convictions	a	b	M
Person years	N_1	N_2	T

- Figure 1. No caption available.

XYY men

Antisocial personality disorder

	Cases ($N = 16$) N (%)	Controls ($N = 45$) N (%)	Odds ratio (95% CI)	P value (Fisher's exact test)
Unstable occupational history	11 (69)	15 (33)	4·40 (1·29 to 14·99)	0·02
Antisocial behaviour in adolescence	12 (75)	12 (27)	8·25 (2·33 to 30·59)	0·001
Antisocial behaviour in adulthood	10 (65)	11 (24)	5·15 (1·52 to 17·44)	0·01
Antisocial personality disorder (RDC)	6 (38)	6 (13)	3·90 (1·03 to 14·71)	0·14

- Table 2. Antisocial behaviour in XYY men and controls

XYY men
Criminal records 1

Criminal convictions	Cases ($N = 17$) N (%)	Controls ($N = 60$) N (%)	Odds ratio (95% CI)	P value (Fisher's exact test)
At least 1	5 (29)	7 (12)	3·15 (0·85 to 11·66)	0·11
> 3	3 (18)	4 (7)	3·00 (0·60 to 14·97)	0·22

- Table 3. Criminal convictions in XYY men and controls

XYY men
Criminal records 2

Offence	Cases (189·40 accum. years)	Controls (664·91 accum. years)	Rate ratio (95% CI)	*P*
Assault	4	5	2·81 (0·75 to 10·46)	0·2
Breach of peace	11	11	3·51 (1·52 to 8·10)	0·005
Theft	11	12	3·22 (1·42 to 7·29)	0·01
Criminal damage	0	2		
Alcohol and drugs	0	0		
Road traffic	3	24	0·44 (0·13 to 1·46)	0·3
Sexual	2	0		
Other	5	22	0·80 (0·30 to 2·11)	0·23
All offences	36	76	1·66 (1·12 to 2·47)	0·01

- Table 4. Rate ratio for convictions in XYY men and controls by offence category

XYY men
Criminal records 3

Variable	Wald	df	*P*
IQ (WAIS-R)	7·37	1	0·01
Social class (I–V)	1·79	4	0·77
Karyotype (XYY or XY)	1·68	1	0·20

- Table 5. Logistic regression: XYY men with or without a criminal conviction as dependent variable and social class, IQ and karyotype as independent variables

XYY men
Alcohol consumption

- The XYY men reported a median weekly alcohol consumption of 30 units (range 2-200) compared with 10 units (range 0-160).
- 27% of the XYY cases can be defined as alcohol dependent according to RDC compared with 7% of the controls.
- In addition, 20% of the XYY men reported regular use of illicit drugs to a clinically significant degree but this was not significantly more than in the controls (odds ratio 2.56, CI, 0.50 to 13.07, P = 0.35).

XXY men
Antisocial personality disorder

	Cases ($N = 13$) N (%)	Controls ($N = 45$) N (%)	Odds ratio (95% CI)	P value (Fisher's exact test)
Unstable occupational history	9 (69)	15 (33)	4·50 (1·19 to 17·03)	0·03
Antisocial behaviour in adolescence	9 (69)	12 (27)	6·19 (1·60 to 23·88)	0·004
Antisocial behaviour in adulthood	6 (46)	11 (24)	2·65 (0·73 to 9·58)	0·1
Antisocial personality disorder (RDC)	3 (23)	6 (13)	1·95 (0·41 to 9·19)	0·43

- Table 6. Antisocial behaviour in XXY men and controls

XXY men
Criminal records

Criminal convictions	Cases ($N = 17$) N (%)	Controls ($N = 60$) N (%)	Odds ratio (95% CI)	P value (Fisher's exact test)
At least 1	2 (12)	7 (11·7)	1·01 (0·19 to 5·38)	0·5
> 3	1 (6)	4 (7)	0·88 (0·09 to 8·39)	0·5

- Table 7. Criminal convictions in XXY men and controls

XXY men
Alcohol consumption

- XXY men reported a lower alcohol consumption than the controls - a median of 5 units per week, however, there was wide variability (0-40 units).
- None of the XXY men gave a history suggesting alcohol dependency or drug dependency.

DISCUSSION 1

- It is widely accepted that delinquency has to be seen as the result of a complex interaction between the individual and his environment influenced by factors that may be genetic, psychodevelopmental and social.
- In this study the difference in frequency of men with criminal convictions between cases and controls appears to be related mainly to lower IQ as seen from the logistic regression analysis.

DISCUSSION 2

- This study confirms previous reports of differences between XYY men and chromosomally normal men in respect of antisocial personality traits and criminal records.
- In XXY men neither the prevalence of APD nor the rate of criminal convictions was increased.

DISCUSSION 3

- Some papers have attempted to address the question of whether the tallness of XYY males contributes to their increased risk of institutionalization.
- From our data in which XYY males were identified by population screening the same trend to slightly shorter stature among the convicted compared with the unconvicted was found among the XYY males as in the controls (XYY convicted v. unconvicted, 188.1 cm v. 189.3 cm; XY convicted v. unconvicted, 175.5 cm v. 177.7 cm).

***Thanks for your attention*!**