

ORIGINAL ARTICLE

Chromosomal Patterns in Convicted Homicide Criminals

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Abstract:

Crime is defined as doing of any act declared by stature or ordinance to be punishable in definite way, such as, by fine, imprisonment or death. The famous Danish 'Adoption studies' states that in addition to socio-economic factors, hereditary factors play an important role in the determination of criminality. Normally males have 46XY karyotype. The males with 47XYY karyotype may show a tendency towards behavioural problems like hyperactivity and distractibility and they are believed to be indulging in criminal activities. Studies of XYY males indicate that they are more prone to aggressive behaviour than the XY males. The present study was conducted at Karnataka Institute for DNA research, Dharwad by collecting blood sample from 53 prisoners who were convicted under S. 302 IPC to analyze the chromosomal pattern by doing karyotyping. All the 40 out of 53 subjects who were chromosomally analyzed showed the normal 46XY chromosome pattern. No abnormality was found in terms of number of chromosomes. Majority of the crimes have occurred against property issues (58.49%), followed by financial or money issues (15.09%), dowry issue (15.09%) and rest were due to other matters. Lower socio-economic status, poor education, personal habits might have played an important role in the causation of crimes.

Keywords: Chromosome; Karyotype; 47XYY; Criminals; S. 302 IPC; Aggression.

Introduction:

The subject of aggressive, antisocial, and criminal behaviour in man is as old as the history of man himself. Crime is defined as doing of any act declared by stature or ordinance to be punishable in definite way, such as, by fine, imprisonment or death. The famous Danish 'Adoption studies' states that in addition to socio-economic factors, hereditary factors play an important role in the determination of criminality. Scientific study of criminal behaviour is, however much more recent. All kinds of advanced scientific methods should be employed for detection of crime and to prove the guilt of criminal, so that innocent subjects are not victimized.

Normally males have 46XY karyotype. XYY syndrome is an aneuploidy of the sex chromosomes in which a human male has an extra Y-chromosome, giving a total of 47 chromosomes instead of 46 chromosomes. This produces a 47XYY karyotype. This condition usually affects 1 in 1000 male births.¹⁻³ The males with 47XYY karyotype may show a tendency towards behavioural problems like hyperactivity and distractibility and they are believed to be indulging in criminal activities. Studies of XYY males suggest that they are more prone to aggressive behaviour than the XY males.

Previous studies have shown that there is an association between the XYY karyotype males and the criminal behaviour.⁴⁻⁶ We may hope that if a biological or physical basis for criminal behaviour is

found, then one day we can find a cure for it, or if such individuals are detected in early part of their life, they can be given special attention and reformatory education to prevent them from indulging in criminal activities in future.

Materials and methods:

The present study was conducted for a period of 12 months at Karnataka Institute for DNA Research, Dharwad, Karnataka, by collecting blood sample from 53 prisoners who were convicted under S. 302 IPC, in Dharwad Central Jail of Karnataka state. The study was conducted with the aim to analyze the chromosomal pattern in homicide case convicts in prisons by doing karyotyping and to find out whether specific chromosomal abnormalities exist in them and if found whether it has any significant relation with the crime.

A) Inclusion criteria

- 1) Age above 18 years.
- 2) Male individuals.
- 3) Those who are convicted for homicidal act and sentenced by the law.
- 4) Those who are willing to give valid consent (voluntary consent).

B) Exclusion criteria:

- 1) Age below 18 years.
- 2) Those who are under trial.
- 3) Those who had recent blood transfusion (within last 6 months).

Method of collection of data and sampling procedure: After obtaining the consent from the legal and jail authorities and then informed written consent from the subjects, with aseptic

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precautions about 3ml of venous blood was collected from the subject in Sodium heparin coated vacutainers and it was brought to the genetic laboratory at Karnataka Institute for DNA Research, Dharwad, within an hour for karyotyping analysis as per standard operating procedure.

Results:

Chromosomal analysis of 53 male prisoners who are convicted under S. 302 IPC from Central Jail, Dharwad, was done. Out of 53 samples, 13 samples could not be analyzed due to culture failure. So totally 40 samples were studied after karyotyping.

In the present study maximum number of subjects belong to the age group of 41-50 years i.e. 15 subjects (28.30%) and followed by 14 subjects (26.41%) of 31-40 years and least among ≥ 61 years i.e. 6 subjects (11.32%). In the present study 43 (81.13%) out of 53 subjects were married and rest 10 subjects (18.86%) were unmarried.

Above data shows that maximum number of subjects in the study group had literacy level of SSLC or below that is 33 subjects which accounts to 62.26% of total subjects, 7 (13.20%) subjects were illiterate, 7 (13.20%) subjects had studied PUC, 4 (7.54%) had pursued degree and 2 (3.77%) had done master degrees.

In present study, maximum number of subjects were from lower socio-economic status, that is 36 (67.92%) out of 53 subjects. This was followed by 15 (28.30%) subjects belonging to middle class, and the rest 2 (3.77%) belong to upper class.

In the present study majority of the crimes were committed by subjects in group that is 27 (50.94%) out of 53, and other 26 (49.05%) had committed the crime in single.

In the present study majority of subjects did murder of persons due to property issues i.e. 31 subjects out of 53 (58.49%), followed by finance or money related (8 subjects- 15.09%), dowry related issues (8 subjects- 15.09%), and the rest of the subjects were convicted for murder due to love affair related issues (2 subjects-3.77%), and illicit relationships (2 subjects-3.77%), dacoit followed by murder (1 subject-1.88%) and one subject was convicted for rape and murder (1 subject-1.88%).

Two out of 53 subjects studied, were suffering from psychosis disorder and were on treatment for it. Out of 53 subjects studied, 9 had the habit of only smoking, 5 subjects had the habit of only alcohol consumption and 24 had both alcohol and smoking habits. So, in total 29 (54.71%) subjects had the drinking habits.

Karyotyping results: All the 40 out of 53 subjects who were chromosomally analyzed showed the normal 46XY chromosome pattern. No abnormality was found in terms of number of chromosomes.

Discussion:

The present study was undertaken to analyze the chromosomal pattern in homicide case convicts in prison by doing karyotyping and to find out whether specific chromosomal abnormalities exist in them and, to find whether it has any significant relation with the crime or not. Previous studies on men with antisocial behaviour in prisons or institutions for hard to manage criminals have detected an additional Y chromosome in some percentage of men. Though the exact frequency of XYY men in the general

population is not clearly known, chromosomal surveys among random samples suggest that it is lower than that found in the selected populations.

In present study no chromosomal abnormality was found among the 40 subjects karyotyped, and all men have showed the normal 46XY chromosome pattern that is no abnormality was found in terms of number of chromosomes. The present study is in conformity with the following studies;

A study was done by Welch JP et al.⁷ of Johns Hopkins University School of Medicine, Baltimore, Maryland, on 464 inmates of Patuxent institution, who were classified as "defective delinquents". On the assumption that aggression is a significant feature of the syndrome, all senior, non-administrative, custodial officers were asked to answer a confidential questionnaire in which they were asked to list the twelve most aggressive, dangerous or violent inmates. All those twelve inmates were 72 inch or more tall and blood was obtained from ten (two refused). After karyotyping all these were found to be of 46XY chromosome complement.

Duffy JC et al.⁸ analyzed two groups of young males; 18 patients from the Division of Child Psychiatry, University of Minnesota, and 28 juvenile delinquents from Lino Lakes Juvenile Detention Center. All patients were screened regarding stature and behaviour characteristics. None of the 46 cases analyzed showed any abnormality, either of autosomal or of sex chromosomes.

Where as many studies which have been conducted on prisoners who were of aggressive behaviour or who have done murder showed the presence of XYY chromosome complement in few percent of men.

In 1965, British cytogeneticist Patricia A Jacobs and colleagues⁶ at Western General Hospital in Edinburgh, made a survey of chromosome in 197 male criminals. Out of which they found that twelve had chromosomal abnormality; seven had 47 chromosomes, and an XYY sex chromosome constitution, one had 48 chromosomes and XXYY sex chromosome constitution, and one was XY / XXY mosaic. The remaining three had structural abnormalities of the autosomes.

Casey and coworkers in their study among 100 mentally subnormal or mentally ill males detained for antisocial acts found 16 XYY's in England and all the XYY subjects were at least 6 feet tall.⁹

In a study done by Telfer MA et al on 129 tall men in four different institutions for the care of criminal males in Pennsylvania, found 5 with the XYY pattern as well as 7 with the Klinefelter syndrome (6 XXY's and 1 XXXY). All the aneuploidy subjects were mentally ill.¹⁰

Study done by Weiner et al in H.M. Prison Pentridge in Melbourne, Australia, found 3 XYY and 1 XYY / XYYY mosaic chromosome patterns among 34 tall (69-89.5 inch) male criminals.¹¹

Gosavi SR and others made a study to find out if there is any definite association between the criminality and chromosomal aberrations. They selected individuals who were convicted by the Court of Law under S. 302 IPC as murderers in the Central Jail,

Table 1. Age wise distribution of subjects.

Sl. No	Age group (years)	Number of subjects (Percentage)
1	18-30	11 (20.75%)
2	31-40	14 (26.41%)
3	41-50	15 (28.30%)
4	51-60	7 (13.20%)
5	≥ 61	6 (11.32%)

Table 2. Literacy level of subjects.

Illiterate	≤ S.S.L.C.	P.U.C.	Degree	Master degree
7 (13.20%)	33 (62.26%)	7 (13.20%)	4 (7.54%)	2 (3.77%)

Table 3. Socio-economic status of subjects.

Status	Number of subjects (Percentage)
Lower	36 (67.92%)
Middle	15 (28.30%)
Upper	2 (3.77%)

Nagpur and subjected them to cytogenetic study. By doing cytogenetic study of these criminals they found two cases of 47, XYY and two cases of 46, XYr (X). They stated that there is a definite association between the criminal behaviour and XYY chromosome.⁴

In this study, maximum number of subjects were from lower socio-economic status that is 36 (67.92%) out of 53 subjects. This is followed by 15 (28.30%) subjects belonging to middle class, and the rest 2 (3.77%) belonged to upper class. Criminological research generally demonstrates a disproportionate involvement of the lower socioeconomic classes in crime.¹²

In the present study majority of subjects had committed crime due to property issues followed by finance or money related, dowry related issues, and the rest of the subjects were convicted for murder due to love affair related issues and illicit relationships, dacoit followed by murder and one subject convicted for rape and murder.

Out of 53 subjects studied, 9 had the habit of only smoking, 5 had the habit of only alcohol consumption and 24 had both alcohol and smoking habits. So, in total 29 (54.71%) subjects had the drinking habits. This is in relation with the study done by Blumstein A et al who concluded after five studies that prisoners with drinking problems have higher assault rates than prisoners without drinking problems.¹³

Conclusion:

Karyogram of all the 40 criminals analyzed showed the normal 46XY chromosome pattern. Lower socio-economic status, poor education, personal habits might have played an important role in the causation of crimes. Majority of the crimes have occurred against property issues (58.49%), followed by financial or money issues (15.09%), dowry issue (15.09%) and rest were due to other matters. Rigorous proof of an association between chromosomal disorders and antisocial behaviour requires wide-scale chromosomal screening of the normal population with longitudinal study of all subjects manifesting sex chromosome errors is needed. If found, comparison of chromosomally abnormal criminal males with their chromosomally normal siblings and with their chromosomally normal criminal peers is needed. Possession of XYY does not by itself predispose one to criminal or violent behaviour as there are many underlying

Table 4. Crime committed by subjects single or in group.

Crime committed	Number of subjects (Percentage)
Single	26 (49.05%)
Group	27 (50.94%)

Table 5. Causes for conviction of subjects.

Cause	Number of subjects (Percentage)
Property issues	31 (58.49%)
Dowry related	8 (15.09%)
Finace/money	8 (15.07%)
Other matters	6 (11.32%)

Table 6. Height wise distribution of the subjects:.

Height in cm	Number of subjects (Percentage)
≤ 160	9 (16.98%)
161-170	34 (64.15%)
170-180	9 (16.98%)
≥ 181	1 (1.88%)

factors such as intellectual ability, socio-economic, familial, societal issues, some aggravating and intervening factors also contribute to the violent behaviour.

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Conflict of interest: None to declare.

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