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Biochemical aspect of crime: a case study of testosterone levels among rapists in Enugu State

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Abstract

Testosterone concentration is a contributing factor to rape tendency. Our research aimed to determine the plasma testosterone concentrations in male rapists. Subjects (100) recruited from Enugu state prison grouped viz: Violent-rapist (VR), nonviolent-rapist (NVR), violent child-molester (VCM), nonviolent child-molester (NCM), and none rapist (NR). The blood sample was collected in the morning (8-9) for four months by veno-puncture and used in the determination. The testosterone levels determination was by the enzyme-linked immunosorbent assay method. The results indicated the mean age of 33 (VR), 34 (NVR), 46 (VCM), 47 (NCM), and 32 (NR). The age at first intercourse was highest in NCM (18) and lowest in VR (13). Heterosexuals were highest in VR (14) and lowest in NCM (6). Homosexuals were highest in NCM (4) and non in VM, NVR, and NR (0). In bisexuals, NVR and NCM were the highest (4), the NR (1) was the lowest. The concentrations of testosterone (in ng/100ml) were 8.65 (VR), 9.23 (NVR), 9.63 (VCM), 7.73 (NCM) and 7.95 (NR). The testosterone concentration of the VR, NVR, and VCM is higher than NR. The NCM was lower than the NR. This result suggests that VR, NVR, and VCM are associated with higher testosterone concentrations in males. The modest associations indicate that there might be other influencing factors. The relationship between testosterone levels in rapists and child molestation is, at best, tentative. In some people, hormonal factors might influence the likelihood of rape and child molestation.

Keywords: Crime, Rapists, Child molestation, Testosterone level, and Male subject.

Introduction

Rape is sexual violence that can happen to a man or a woman. Regarding women, rapes delineate sexual violence against women. It is an act of sexual assault that results in or is likely to result in physical, sexual, or mental harm or suffering to women, including threats of such acts, coercion, or arbitrary deprivation of liberty, whether occurring in public or private life.[1-3] This sexual violation is against their consent. The occurrence can be in times of peace and armed conflict situations. It is global and visualized as one of the topmost traumatic, pervasive, and common human rights violations, accounting for 30% of women in every corner of the globe.[4-5]

In Nigeria, 12–25 percent of women have been raped at a particular time in their lifetime,[6] making the study of paramount importance. The rape issue became common during the Covid-19 pandemic lockdown. This time, the perpetrator was mainly close associates. They could be religious leaders, teachers, guardians, fathers, brothers, relatives, neighbors, friends, acquaintances, or even strangers.

Newer findings suggest that violent sexual behaviour is not due to any single factor. Therefore increasing interest is geared towards the role played by biological factors. Anger at women and needing to control or dominate them has been suggestive as part of the motivation for rape.[7-10] The vital force

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behind anger dominance in men is testosterone level.

Many dimensions of human sexual behaviours connect to testosterone levels, namely sexual arousal and intercourse[11] and sexual fantasies.[12] Interest in a sexual act and sperm ejaculation may have connotations to androgen level[13] likewise spontaneous erections.[14-15] The relationship between testosterone and aggressive behaviours, alongside sexual desire, justifies the need to investigate testosterone levels among rapists. However, in the researchers' opinion, it results from the interaction of biological, developmental, and environmental factors. Centrally this study is not an excuse for raping. It may change the way rapists with hormonal imbalances are taken care of in the judiciary system. In addition, change the mindset of the populace on rapists with hormonal imbalance.

The study's aim is the determination of testosterone concentration in suspected rapists. Its specific objectives were to establish the relationship between testosterone level and rape and compare the testosterone level in rapists to non-rapists.

Materials and Method

Sample collection

Their health personnel (Enugu State Prison) withdrew the blood sample from each subject by veno-puncture techniques between 8a.m. and 9a.m. The blood samples were separated using a centrifuge machine. The resulting plasma was frozen until required.

Sociodemographic background, marital status, length of incarceration, and family background of participants, were retrieved from files and through the oral interviews by the personnel.

Inclusion criteria in the study were that: the offense was entirely nonviolent, and the offender acted alone or was brutally violent. Victims who were thirteen years of age and below are considered child molesters, and eighteen years and above as rapists. Subjects (100) met these criteria and enrolled after giving their consent.

Exclusion criteria in the study were males below five years and females. The health conditions of offenders were considered based on previous prison medical examinations and self-reports. There was no trace of major mental illness or psychotic problems. Furthermore, none of the offenders was on psychotropic drugs or medication for chronic physical disease.

Police officers assisted in retrieving the offenses reported in their files and used them in the classifications of offenders.

Each piece of information retrieved contains the level of violence and the details of the offense committed. The assisting officer helped to classify the subject as violent or nonviolent in each incident.

Ethical considerations

The personnel and participants received promises of the confidentiality of the information given. The study was under the ethical standards of the Declaration of Helsinki and in line with the standards of the Ethical Committee of Nigeria Police Academy. There were no conflicts of interest.

Testosterone determination

It was by the method involving the principle of a competitive binding assay. Immunoassay of the plasma testosterone for each sample was from the mean of the triplicates. Sampling was in singlicate on all three automated immunoassay instruments as specified in the manufacturer's manual for the procedure. The automated machine, Chemiluminescent Microparticle Immunoassay (CMIA) technology (Chemiflex™), was used for the study and sourced from Abbott Ireland Diagnostics Division Lisnamuck, Longford Co. Longford Ireland.

Statistical analysis

The data were expressed, as mean testosterone concentrations, in ng/100ml of the members in each group, standard deviation, and the percentage difference for each mean testosterone concentration calculated from the testosterone concentration.

Results

A total of 100 subjects participated in the present study. Table 1 shows the demographic and self-reported sexual characteristics of the subjects. The grouping of participants is as follows: violent rapists, nonviolent rapists, violent child molesters, nonviolent-child molesters, and control. Participants' ages, number of lifetime sex partners, marital status, sexual orientations, and first intercourse ages were equally tabulated.

The mean age (in years) in Table 1 of the 16 participants of the violent rapists was 33.00, and the standard deviation of ±4.9. The sexual orientations were as follows: 14 were heterosexuals, 2 were bisexuals, and no homosexual. The number of lifetime sex partners was as follows, 5 had less than 10. 4 had within 10-50, 2 had within 51-100, and 5 had more than 100. The marital status was as follows: 7 (singles), 4 (married), and 5 (co-habiting). The mean age at which members of this group had their first sexual intercourse was 13.70, and the standard deviation was ±2.5.

For the nonviolent rapist in Table 1, the mean age for the 14 participants was 34.00 with a standard deviation of ±3.60. The sexual orientation, 10 were heterosexuals, none were homosexual, and 4 were bisexuals. The number of lifetime sex partners was as follows: 5 had less than 10, 3 had within 10-50, 2 had within 51-100, and 4 had more than 100. The marital status was as follows: 6 (single), 3 (married), and 5 (co-habiting). The mean age of their first sexual intercourse was 14.00 and with a standard deviation of ±0.5.

For the violent child molester, the mean age for the 13 participants was 46.60, and the standard deviation of ±11.6. The sexual orientation was as follows: 7 were heterosexual, 3 were homosexuals, and 3 were bisexuals. The numbers of lifetime sex partners were as follows: 5 had less than 10, 4 had within 10-50, 3 had within 51-100, and 1 had more than 100. The marital status was as follows: 6 (single), 3 (married), and 4 (co-habiting). The mean age of their first sexual intercourse was 17.00 and with a standard deviation of ±3.70.

For the nonviolent child molester, the mean age for the 14 participants was 47.50, and the standard deviation of ±10.50. The sexual orientation was as follows: 6 are heterosexuals, 4 are homosexuals, and 4 are bisexuals. The lifetime sex partners were 4 in less than 10, 4 within 10-50, 4 within 51-100, and 2 more than 100. The marital status was as follows: 5 (single), 4 (married), and 5 (co-habiting). The mean age of the first intercourse was 18.10 and a standard deviation of ±0.60.

The control (10 participants) had a mean age of 32.60 and a standard deviation of ±9.00. The sexual orientation was 9 for heterosexuals, 1 for bisexuals, and none for homosexuals. The lifetime sex partners were 4 in less than 10, 3 within 10-50, 2 within 51-100, and 1 in more than 100. The marital status was 5 for single, 1 for married, and 4 for co-habiting. The mean age of the first intercourse was 16.30, and the standard deviation was ±2.30.

Table 2 presents the mean testosterone concentrations. The mean testosterone concentration of violent rapists was 8.65ng/100ml and a standard deviation of ±0.76. The mean testosterone concentration of the nonviolent rapist was 9.23ng/100ml with a standard deviation of ±0.90. The mean testosterone concentration for the violent child molester was 9.63ng/100ml with a standard deviation of ±1.37. The nonviolent-child molester has a mean testosterone concentration of 7.73ng/100ml with a standard deviation of ±0.60. The normal control mean testosterone concentration was 7.95ng/100ml with a standard deviation of ±0.66. The violent child molester had the highest concentration of testosterone (9.63ng/100ml) in their plasma, followed by nonviolent rapists (9.23ng/100ml). The group with the lowest mean testosterone concentration is the nonviolent-child molesters (7.73ng/100ml).

Table 3 compares the average mean testosterone level of rapists viz violent-rapist plus nonviolent-rapist (total rapist) and child molesters viz violent-child molester plus nonviolent-molester (total child molester). Rapist's average mean testosterone concentration was 8.94ng/100ml. The average mean testosterone concentration of violent-child molester and nonviolent child molesters were 8.68ng/100ml. The average mean difference in the testosterone concentration of the rapists and child molesters was 0.52ng/100ml. The average mean difference between the testosterone concentration of violent rapists and that of violent child molesters was -0.98ng/100ml. The average mean difference between the testosterone concentration of the nonviolent rapist and that of the nonviolent child molester was 1.50ng/100ml. The lower testosterone concentration resulted when the average mean difference in the testosterone concentration of violent rapists and violent child molester were calculated (Table 3).

Table 4 shows the percentage difference of the mean testosterone concentration (ng/100ml) of each group from that of the control. The percentage change in the mean testosterone concentration of the violent rapist was 8.81% compared to the control

Table 1: Demographics and self-reported sexual characteristics

Group	Age (years)	Sexual orientation			Number of lifetime sex partners (N)				Marital status			1st intercourse
		He	Ho	Bi	<10	10-50	51-100	> 100	S	M	C	Age
VR	33.00±4.90	14	0	2	5	4	2	5	7	4	5	13.70±2.5
NVR	34.00± 3.60	10	0	4	5	3	2	4	6	3	5	14.00 ± 0.5
VCM	46.60±11.60	7	3	3	5	4	3	1	6	3	4	17.00±3.7
NCM	47.50±10.50	6	4	4	4	4	4	2	5	4	5	18.10 ±0.6
C	32.60±9.00	9	0	1	4	3	2	1	5	1	4	16.30±2.3

Grps = Groups, VR = violent rapists, NVR = non violent rapists, VCM = Violent Child Molesters, NCM, Non Violent Child Molesters, C = Normal Control, He = heterosexual, Ho= Homosexual, Bi = Bisexual, S = Single, M = married and C = Co-habiting.

Table 2: Testosterone concentrations

Group	Numbers in the group	Testosterone concentration (ng/100ml)
Violent rapists	16	8.65 ± 0.76
Non-violent rapists	14	9.23 ± 0.90
Violent child molesters	13	9.63 ± 1.37
Nonviolent child molesters	14	7. 73 ± 0.60
Normal control	10	7.95 ± 0.66

Table 3: Comparison of the average of the mean testosterone level of rapists and child molesters in ng/100ml

Testosterone analysis	Mean testosterone concentration	Change in testosterone concentration
Rapists average of the mean testosterone concentration (violent plus non-violent)	8.94	
Child molesters average of the mean testosterone concentration (violent plus non-violent)	8.68	
Difference in average of the mean rapists and child molesters testosterone concentration	0.26	↑
Difference in average of the mean violent rapist and violent child molester testosterone concentration	-0.98	↓
Difference in average of the mean non-violent rapist and non-violent child molester testosterone concentration	1.50	↑

↑ = higher testosterone concentration
↓ = lower testosterone concentration

Table 4: Percentage differences of the Testosterone concentrations

S/N	Name of Group	Percentage Differences (%)
1	Violent Rapist	8.81
2	Non-violent Rapist	16.10
3	Violent child molester	21.13
4	Non-violent child molester	-2.77
5	Normal Control	-

group. The percentage change in the mean testosterone concentration of nonviolent-rapist was 16.10% when compared to the control group. The percentage change in the mean testosterone concentration of the violent child molester was 21.13% from the control group. The nonviolent-child molester had a percentage change in mean testosterone concentration of -2.77% from the control group.

Discussion

There have been attempts to explain the diversity in the predisposition to violence by variations in testosterone levels. The high basal testosterone level correlates with aggressive behaviors.[10,16-18] The previous studies have compared the testosterone levels of behaviourally extreme populations with those of control/nonviolent subjects were Dabbs *et al.,*[19] Ehrenkranz *et al.,*[9] Hubert,[20] and Rada *et al.*[21]

Based on the literature reviewed, we exerted that rapists would have higher testosterone levels than child molesters and that the violent offenders would have higher testosterone levels than the nonviolent offenders in each group. The confirmation is in Table 3 and mixed in Table 2. The trends are consistent with several previous reports.[22-24]

The violent child molesters' mean testosterone level (9.63ng/100ml) was similar to those of nonviolent rapists (9.23ng/100ml). The testosterone concentration of violent rapists and violent child molesters was higher than the control. The observation explains why higher testosterone is a drive to violence. The trend is similar to that of some other studies that indicate a relationship between plasma testosterone concentration and aggressive behaviour in criminal and non-criminal populations.[9,25-26]

In this present study, the mean testosterone concentration of the control (7.95ng/100ml) did not differ much from the mean testosterone concentration of violent rapists (8.65ng/100ml) and nonviolent-children molesters (7.73ng/100ml). The finding is consistent with Rada *et al.,*[21,27] which showed no statistical difference between the sex offenders and the control male when other factors (violence tendencies) were absent. The violent rapists (8.65ng/100ml) have a lesser difference from the control group. It could be due to factors from other sex hormones.[28]

There was not much difference between the rapist and control based on our study. The mean concentration of testosterone level of the rapists was higher than the control, as earlier presumed. The higher testosterone concentration can present difficulty in crime resolution, as in the present study. The study also revealed no strong relationship between the mean testosterone concentration of control males and their sexual activity, and this is consistent with findings from studies by Persky *et al.,*[25] and Buena et al.[29] The information about their sexual activity was from the subject's self-reports. It could affect the accuracy of the information provided, such as the number of lifetime sex partners, making the values a rough estimate.[30]

The lowest age of first intercourse in the group studied was 13.7 years for those in the violent rapists' category (Table 1). The researchers opined that the early age of first sexual intercourse is a factor in why those who started having sex earlier ended up as violent rapists. The age at first sexual intercourse could increase their desire to have sex and serve as a sex driving factor.

From our study also, violent rapists had a lower mean testosterone concentration than nonviolent rapists. The study's lowest mean testosterone concentration was in the nonviolent-child molester group. The finding is agrees with Ehrenkranz *et al*.[9] The study was on the testosterone concentration in 12 prisoners, and they found out that those that were violent had higher serum testosterone concentration

than the nonviolent prisoners.

Conclusion

Antisocial behaviours are present in rapists and child molesters and are related to testosterone concentration. The results of our study reviewed that testosterone concentration cannot be inconsequence as a factor connected with rape. The abnormal testosterone concentration should be in consideration when handling the crime of rape and, if need be, can be sent to an appropriate place for further action. The testosterone levels may vary with sexual activity in sexual offenders.

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