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Forensic Analysis of the Correlation of ABO Blood Group Frequency and Criminalities among Female Inmates in a Typical Nigerian Prison

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ABSTRACT: The frequency of ABO blood group was carried out among inmates in a typical Nigerian prison. This study sought to correlate blood grouping with crime to determine whether a relationship could be established. The results obtained will serve as a platform for instituting awareness to relevant authorities and the public at large. The experiment was carried out at the hospital premises of the Kirikiri medium prison Apapa Lagos Nigeria. A total of 212 female inmates voluntarily availed themselves for this study. Blood was taken by piercing the thumb with a lancet and dropped on the card. The ABO and rhesus blood grouping was determined using felines card method with commercially prepared antisera. The frequency of each blood type was calculated. Among the female inmates charged for the various crimes used in this study, blood group O⁺ was more prominent for inmates charged for stealing (40%), fraud (52%), robbery (41%) and human trafficking (36%) followed by blood type B⁺ having highest frequencies for murder (51%) and drug abuse (45%). Blood type A⁺ has the least occurrence having highest frequency for only drug abuse (48%). This study indicates that Blood group O⁺ had the highest frequency among inmates convicted for the various crimes except for murder and drug abuse. Blood type AB⁺ and AB⁻ had the least frequency when compared to other blood groups in the various crime considered. Some variations in frequencies were observed. This study therefore shows that blood type O⁺ might predispose individuals to crimes

Keywords: Blood, Forensic, Inmates, Frequency, Criminalities

Introduction

Blood is a bodily fluid in animals that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products away from those same cells. In vertebrates, it is composed of blood cells suspended in blood plasma. Plasma, which constitutes 55% of blood fluid, is mostly water (92% by volume), and contains dissolved proteins, glucose, mineral ions, hormones, carbon dioxide (plasma being the main medium for excretory product transportation), and blood cells (Demir *et al.*, 2007). Blood can be classified into different groups based on the presence or absence of inherited antigenic substances on the surface of red blood cells (RBCs). Thirty-two (32) blood-group systems have been identified including the ABO and Rh systems. Many of the blood group systems were named after the patients in whom the corresponding antibodies were initially encountered (Joshua, 2012). Blood types are inherited and represent contributions from both parents.

Forensics use a system called the 'ABO System', which is a system that measures antigens; antigens within the body determine blood type and are normally categorised as either A or B. Several of these red blood cell surface antigens can stem from one allele and collectively form a blood group system (Maton *et al.*, 1993).

The ABO system which involves the presence of antigens on red blood cells are encoded by the ABO locus on human chromosome 9. In the ABO system, the A allele and the B allele are co-dominant and the O allele is recessive. Thus, if a person's ABO the blood type is O, he or she has two O alleles. If, however, a person's blood type is A, he or she has either two A alleles or one A alleles or one O allele. Similarly, if a person has type B blood, this indicates the presence of either two B alleles or one B allele and one O allele. Some people have type AB blood which means they inherited both A allele and one B allele. In case of questioned paternity, ABO blood-typing can be used to exclude a man from being a child's father. Despite their usefulness in this regard, ABO blood groups cannot be used to confirm whether a man is indeed a child's father due to several other factors. Over time, the use of additional blood antigens such as those associated with Rh system help to refine the use of blood-typing for both paternity and forensics. The Rhesus antigens, which can be categorised as Type D; should an individual's red blood cells have these Rhesus antigens, they are classified as Rh positive and likewise if they do not appear they are classified as Rh negative (Bashwari, *et al.*, 2001).

At a crime scene where there has been a blood spill from either that of the victim or that of the assailant, and indeed in some instances that of both parties; a serologist would take blood samples in order to identify which blood belongs to whom. Forensics use blood samples for the identification of criminals. Blood and other body fluid collected from crime scene has been reported to play an important role in the identification and investigation of criminal cases (Mondal *et al.*, 2012). Although much work has done in the area of using blood for identification, scientific information is still sparse in the area of the correlation between blood grouping and criminalities. The need therefore arises to find the relationship between blood group and crime involvement. If we have this possible correlation established it could aid criminal investigations especially in the identification of individual suspects in a criminal investigation. This study therefore sought to correlate blood grouping with crime occurrence involving some inmates of the Kirikiri medium prison Apapa, Lagos, Nigeria.

Materials and methods

Materials used: Materials used include Anti sera A, B and D, Cotton wool, Alcohol swab, Blood group test card X 1 (inside foil pouch), Blood group result card ,Lancets X 2 , Glass rod ,Applicators (eldonsticks) and Disposable container.

Blood Group and Rh determination: The ABO and rhesus blood grouping was determined using felines card method 2005. Drops of antigens for A, B, AB and O blood groups were placed separately using, pipette, on a tile with one row of four columns each marked A, B, AB and O respectively. A drop of the subject's blood was placed on the anti sera in each column. The cell and serum in each circle were then mixed with a stirrer, and the files were rocked for a while. After one minute, the mixture was examined for agglutination. Agglutination in a particular mixture indicated the ABO blood group. When there was no agglutination in the anti A and B mixture, the sample was O. In the case of anti D column, agglutination means the donor is Rhesus positive while absence of agglutination signifies Rhesus negative.

Clearance: This study was approved by the Lagos State Comptroller of Prisons through the Deputy Comptroller of Prisons Kirikiri Apapa, Lagos, Nigeria. Informed consent was obtained from all the participants used in this experiment.

Limitations: Some of the limitations encountered during the course of the study were due to the fact that some of the inmates are illiterate and only understood their native languages, so it was difficult to communicate with them because of language barrier. Secondly, religious beliefs and trust and thirdly, fear of the unknown. All these factors posed as barriers which made some of them to be reluctant in participating in the experiment.

Statistical analysis: Descriptive statistics was used to illustrate the data. Results were expressed as the mean \pm SD. A total of 212 female inmates participated in this study. Age range of individuals was between 20-55 years.

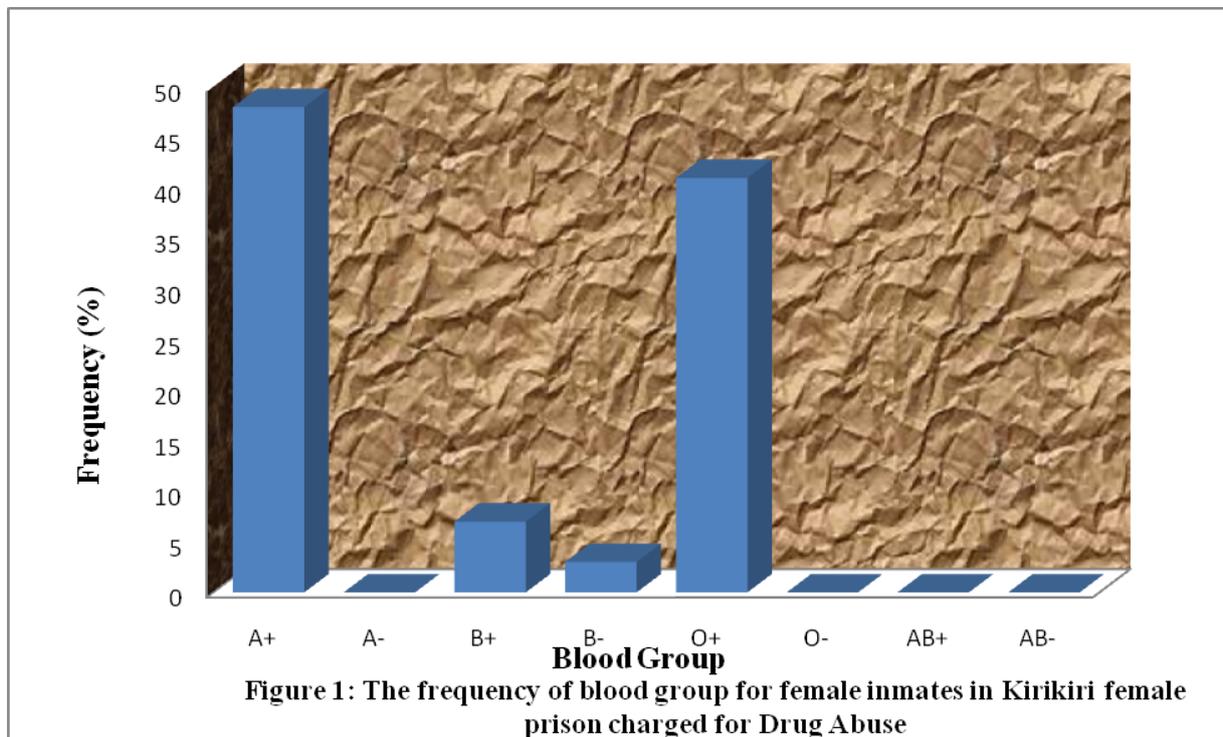
Results

Figure 1 shows the percentage frequency distribution of ABO blood group for female inmates charged for drug abuse. The most prevailing group is blood group A⁺ occurring with 48%. Blood group O⁺ was highest with 41% when compared with B⁺ and AB⁺ which gave 7% and 0%, respectively. It was also observed that blood group A⁻, O⁻ and AB⁻ recorded 0% for the inmates compared with blood group B⁻ (3%).

It was also revealed in Figure 2 that among the inmates charged for stealing, blood group O⁺ was the most prevailing group with 40% occurrence when compared with the other blood groups. 27% of the inmates in this category has blood group A⁺ while blood groups B⁺ and AB⁺ has 12% each. It was also observed that blood groups AB⁻ and B⁻ recorded 0% when compared with blood groups A⁻ and O⁻ which occurred 4% and 8% respectively.

For inmates imprisoned for robbery (Figure 3), Blood group O⁺ was the most predominant group occurring with 41%. Blood group B⁺ occurred with 23% while blood group A⁺ occurred less (18%). The result also revealed that no value was recorded for Blood groups O⁻ and AB⁻ when compared with blood group A⁻ and B⁻ which occurred with 5% and 9% respectively.

The most prevailing blood group for inmates charged with murder, was blood group B⁺ occurring at 51% (Figure 4). Blood group O⁺ was also highest with 34% when compared with other blood group in this category. It was also observed that blood group B⁺ was prominent for male inmates charged for murder.



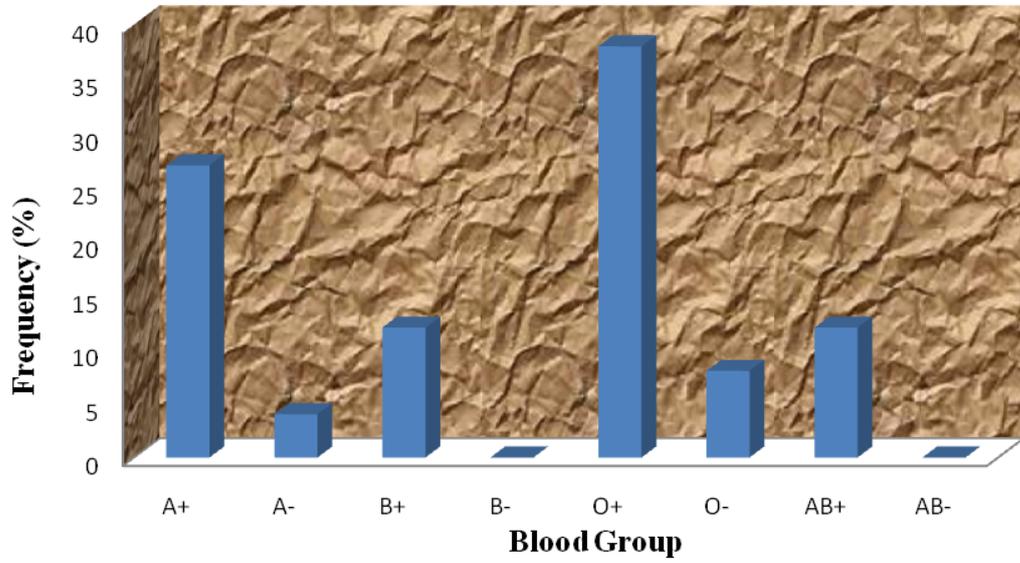


Figure 2: The Frequency of blood group for female inmates in Kirikiri female prison charged for stealing

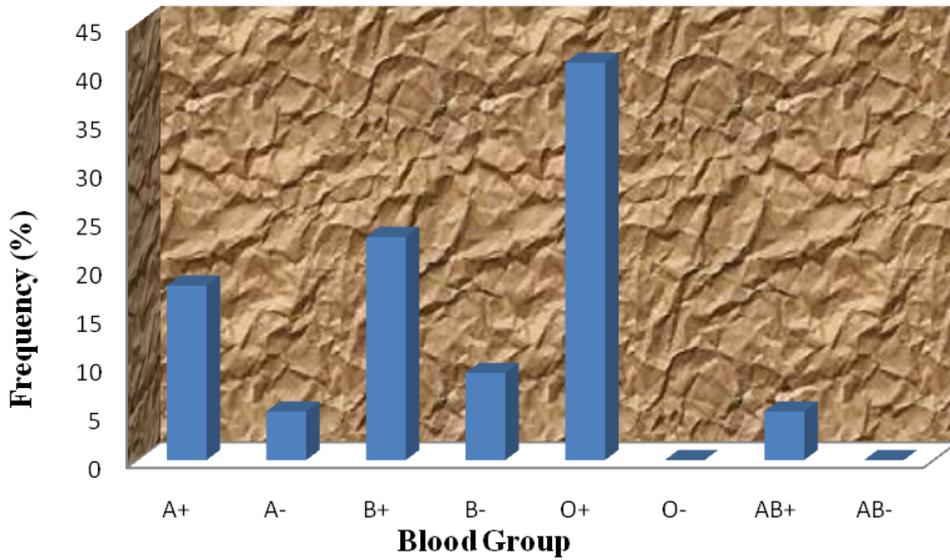
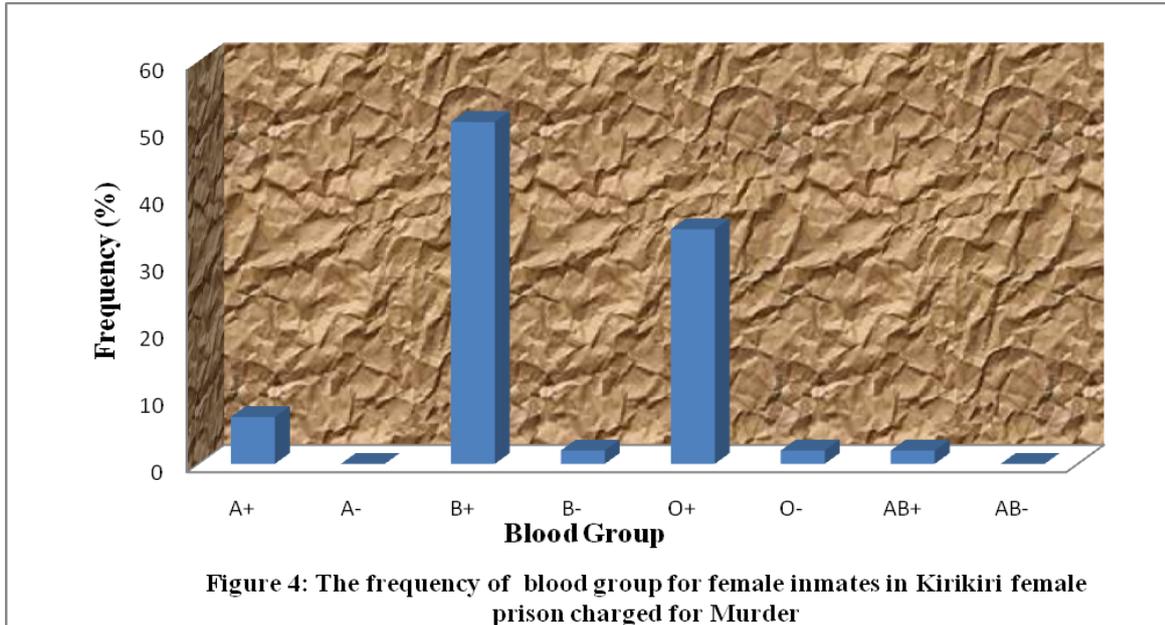
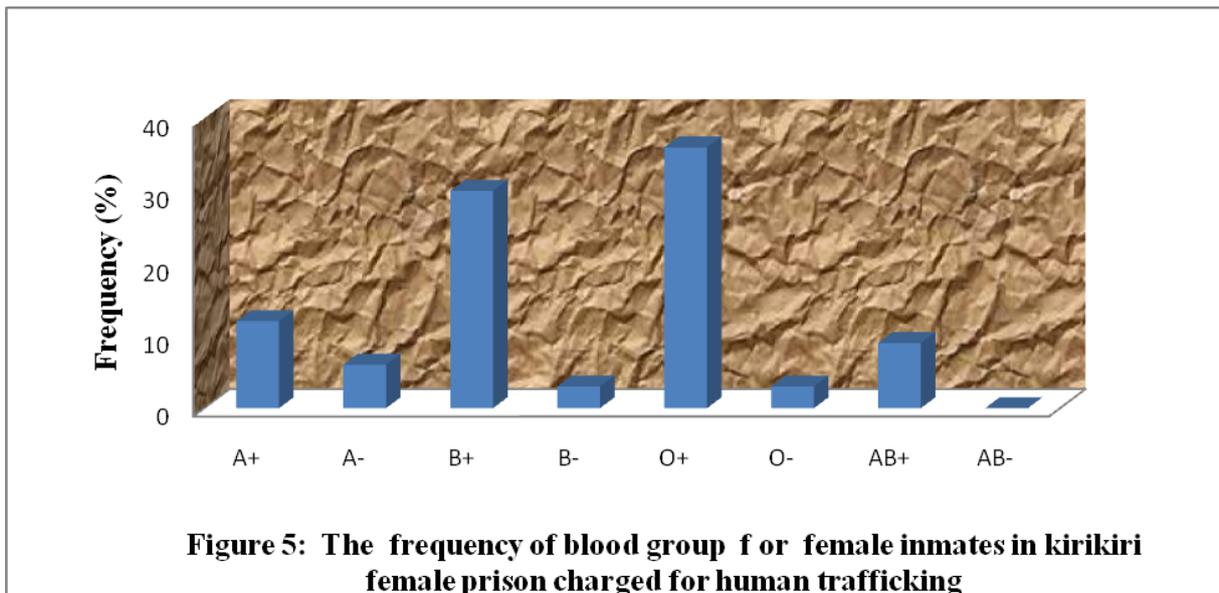


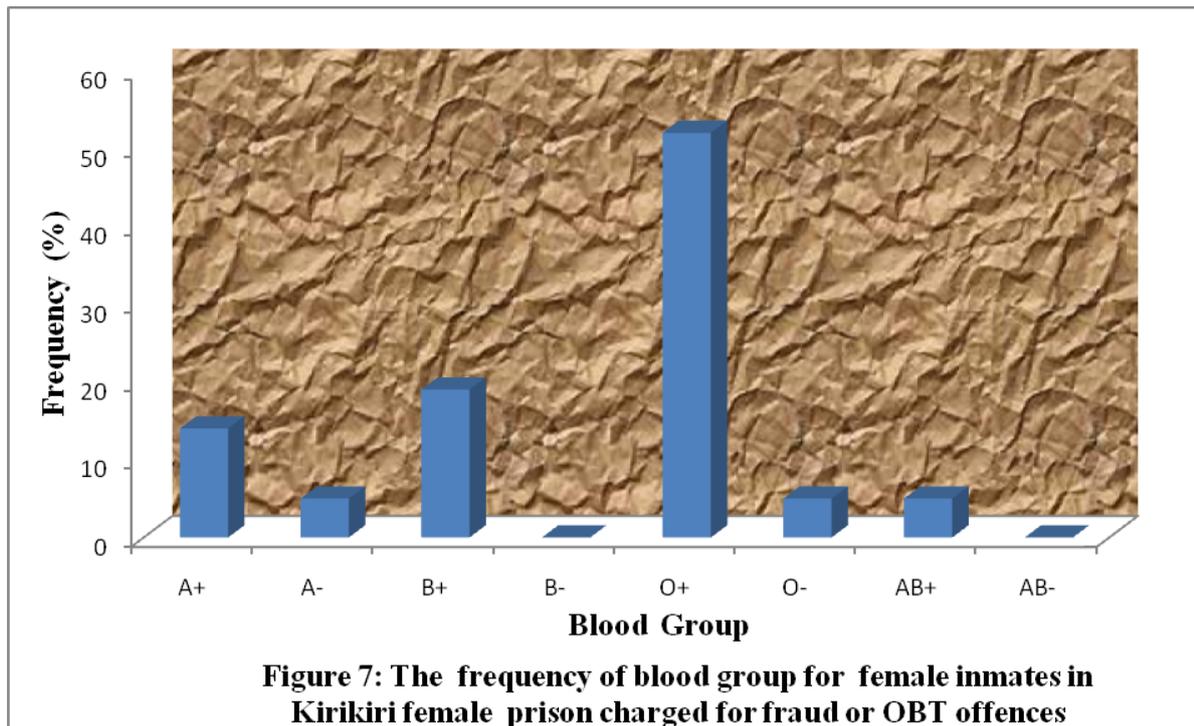
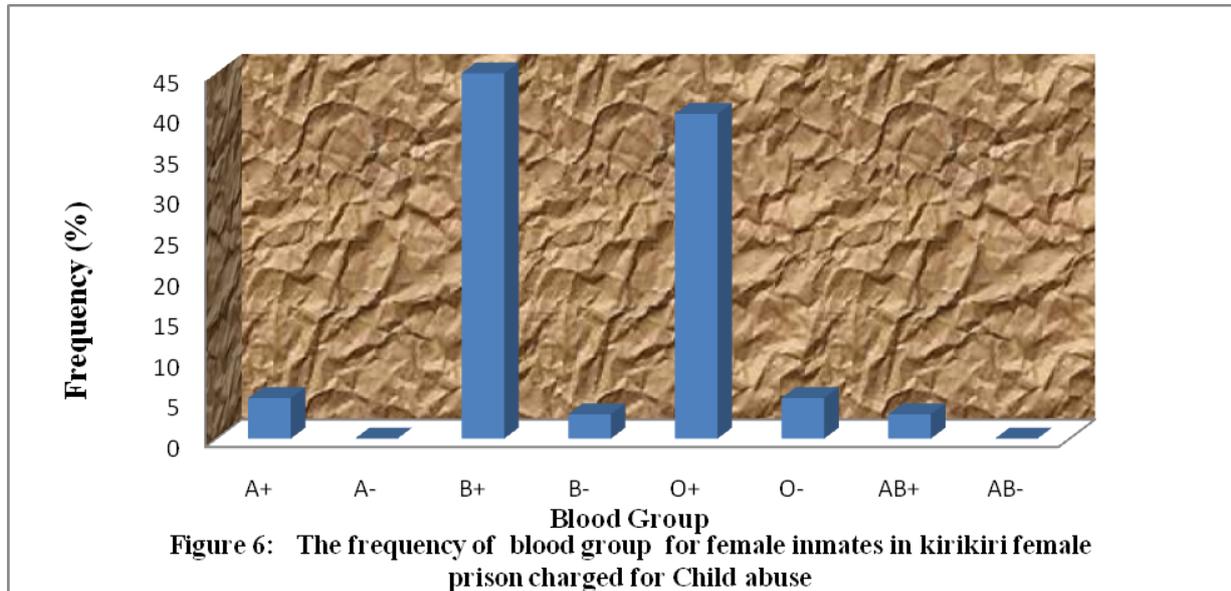
Figure 3: The frequency of blood group for female inmates in Kirikiri female prison charged for Robbery



The frequency of ABO blood group for female inmates charged for human trafficking is shown in Figure 5. It was observed that there was an elevated frequency of Blood group O⁺ (36%) followed by blood group B⁺ (30%). It was also observed that Blood groups A⁺ and AB⁺ were lower (11%, 16%) when compared to blood group O⁺. The frequency of Blood group AB⁻ was not significantly lower compared to blood group A⁻, (6%), B⁻ (4%) and O⁻ (3%) Figure 6 shows that blood group B⁺ was the most predominant group for inmates charged for child abuse with 45%. Blood group O⁺ had a closer value to blood group B (40%) than the others. It was also observed that blood groups A⁺ (5%) and AB⁺ (3%) had lower frequencies compared to blood group B⁺ and O⁺. Blood groups A⁻ and AB⁻ recorded 0%, while blood group B⁻ recorded 3% while blood group O⁻ had 5%.

Blood group O⁺ (52%) is the most prevailing blood group for inmates charged for fraud as seen in Figure 7, while blood group B⁺ occurred with 19% and blood group A⁺ had 14% frequency. Blood group AB had the least frequency when compared to blood group ABO.





Discussion

Over the past three-quarters of a century, information from studies on blood groups has been applied to medico-legal application. The use of blood group substances in medico-legal examination is based on the fact that once a blood

group is established in an individual; it remains unchanged throughout his life (Neiders and Standish, 1977). Though there has not been any research relating blood group to crime, there are documented information from studies carried out on blood group frequency among individuals of different populations. There are also myths correlating blood group and personality among the Asians. The desire to know about blood type, started because of an assertion from the West, which stated that Asians were lower in the evolutionary chain and that they were more closely related to animals than other races. Interestingly, that was the start point where Asian countries became deep into the study of blood type. Although there is no scientific evidence, the Asians opined that personality can influence one's behaviour.

The result obtained for female inmates charged for drug abuse which showed blood group A⁺ as the most prevailing blood group with 48% followed by blood group O⁺ (41%) suggest that personalities with blood groups A⁺ and O⁺ have more tendencies to committing drug related offences than other personalities with other ABO blood groups investigated in this study. This is in proximity with the result obtained by Muhammad *et al.* (2012) which revealed Blood group A⁺ as the commonest in Nepal prison followed by O⁺, B⁺ and AB⁺.

The most prevailing frequency of blood type O⁺ which was observed in this study for female inmates charged for stealing, obtain-by-track (OBT), robbery, and human trafficking suggest that personalities with blood group O⁺ have tendencies to committing stealing, robbery, and human trafficking more than other personalities with other blood types. This result agrees with earlier observation by Roshi (2009) who opined that the worst personality trait was observed in blood group O. He submitted that blood type O's are Obsessive, stubborn, self conscious and uptight. The highest frequency of O⁺ observed in this study for stealing, OBT, robbery, and human trafficking could also be as a result of the blood group O⁺ being the most prevalent. This submission is in conformity with other studies carried in Nigeria which also reported group O as the most prevalent blood group (Oluwadare and Shonekan, 2008).

The occurrence of Rh -ve of blood type AB which was not found for inmates charged for stealing, robbery and human trafficking might be due to less Rh -ves in the population. The distribution of Rh factors among the inmates showed Rh positive to be 90.29% while Rh negative is 10.7% (15 times lower than Rh positive). Each group of ABO contained both Rh positive and Rh negative factors. This gives little credence to the reports of Iyawe *et al.*, (1999) where Rh negative was not found in A and AB blood groups studied. But in this study Rh -ve of blood type A gave the following: 7%, 5%, 6% for stealing robbery and human trafficking respectively. These values could have arisen due to sample size, probably not large enough for observation of Rh negative in those blood groups.

The results obtained from this study which revealed that blood group B⁺ is more prominent among female inmates charged for murder and drug abuse (51%,45%) suggest that female persons with B⁺ are more prone to committing murder and drug abuse than other blood group types investigated in this study. This result is in agreement with the study carried out in Plateau State where the blood group B dominates the other groups studied (Onwukeme, 1990). It may also be as a result of ethnic differences.

Although recent developments in DNA profiling technique allow highly efficient personal identification using minute amount of forensic specimens such as blood stains, salivary stains, and other tissues. ABO blood grouping still is informative and has a niche in for forensic identification. In Japan, ABO blood grouping is examined in suspects of criminal cases before DNA profiling (Kobayashi *et al.*, 1999). Mukherjee and Chattopadhyay (1976) have reported a case, wherein precise identification of the diseased was done by blood grouping of teeth by AE technique. Kuo (1982) has reported a homicide case in which a conviction of first-degree murder was achieved and the identity of the missing person was possible by determining the genetic inheritance from blood grouping

Conclusion

This study revealed that blood group O⁺ has the most occurrence for female inmates charged for various crimes. Blood group O⁺ was more prominent for inmates charged for stealing, fraud, robbery and human trafficking, followed by blood type B having highest frequencies for murder and child abuse crimes. Blood type A has the least occurrence having highest blood group frequency for only drug abuse. This study revealed that Blood group O was most frequent among the ABO blood groups occurring with highest frequency in most of the crimes recorded in this study. Thus this result shows that blood type O⁺ might predispose individuals to committing crimes than other blood group types.

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